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GREAT STORMS

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STORM.

(From a water colour by N. Pocock.)

GREAT STORMS

BY

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AND

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LONDON

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PREFACE

WE wish to thank Messrs. Gieves for permission to quote largely from the narrative of a China seas typhoon printed in the late Sir Christopher Cradock's *Whispers from the Fleet*; also Mr. A. G. H. Macpherson for leave to reproduce from his lithograph of the gale of November, 1854, off Balaclava; Mr. Augustus Walker for the use of N. Pocock's water-colour of "Storm"; the Imperial War Museum for a photograph of Admiral Beechey's picture "After Trafalgar"; the proprietors of the *Illustrated London News* for permission to reproduce from their pages drawings of the Tay Bridge disaster and of the twin eruptions at Martinique and St. Vincent in 1902; and those of *The Times* for the photograph of the recent tornado at Neede.

With regard to the original drawings made for this book by Mr. Cecil King, a few words seem called for in justice both to the artist and to the authors. "If there is any rudeness from critics about the sea being too rough," wrote the artist, "remember who wanted it like that." But remembering that seas 60 feet and more high have actually been observed in gales less extreme than most of those which are described in these pages,

the authors did their best to reassure the artist. Was there not, within the experience of their own friends, the case of the man who, standing on the knightheads of a four-masted barque off Cape Horn, saw the next following sea over the mizzen upper-topsail yard? Or again, that of the man who from the break of the poop of one of the old masted steam frigates, in the Agulhas current, saw the oncoming sea over the fore truck? Though many famous marine painters, from the seventeenth century onwards, have painted storms at sea, there can be little doubt that they have almost uniformly been conservative in their interpretation. This was so, perhaps, because the ships of their days, if they met with such extreme seas, did not come home to tell of them.

L. G. C. L.

V. H.

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GREAT STORMS

CHAPTER I

OF STORMS IN GENERAL

CIVILISED man, being for the most part a town-dweller, is apt to regard with a tolerant smile the picturesque beliefs of his distant ancestors who personified and worshipped the forces of Nature. In these islands he often has occasion to do lip service to the sun, and may even be heard to say that he can understand why some people should be sun-worshippers ; but the deification of wind, rain and thunder has become a thing incredible. Every one, if he cares to do so, is free to know how and why these things happen—though even our best weather experts cannot yet tell exactly when ; and if people formerly made reverential stories to account for them, they did so because they were children of a larger growth. So now we charitably apply the name of myth to the fairy stories invented by grown-up children for their own use ; and among these fairy stories we recognise a large number of Nature myths.

If we leave earthquakes out of account, there can be no doubt that of all the forces of Nature

wind is the most destructive, especially when it can enlist water in its service ; but it is thunder rather than wind which takes the foremost position among the Nature myths. In all early religions the lightning is the weapon, and the thunder the voice, of the supreme deity : the bolts of Jove the Thunderer and the hammer of Thor are counterparts of the Voice of the Lord, which “ is a glorious voice . . . breaketh the cedar trees . . . divideth the flames of fire . . . shaketh the wilderness.” “ The Lord also thundered in the heavens, and the highest gave his voice.”

The comparative neglect of the winds in mythology is not without its significance. It may be interpreted as showing that the primitive religion of Nature myths was developed far inland, where the true force of great winds was rarely felt, and the terror and majesty of a tempestuous sea entirely unknown. The personification of the winds was the work of men who had taken to the sea, and, to judge from early Greek legend, was prompted by fear. The winds were dangerous and irresponsible : it was, therefore, for the good of man that they should be tied up together in a bag, of which the god of the sea had charge. The seaman of the Homeric age bought his fair wind from Poseidon just as his counterpart of the nineteenth century did from Russian Finns ; and each alike feared and mistrusted the custodian, convinced of his power, but suspicious at once of his benevolence and of his honesty.

To a poet the unrest of great winds suggests a parallel with the mental turmoil of those who yield without restraint to the turbulence of love ; and it was, as may be supposed, on the principle of making the punishment fit the crime that Dante peopled the second circle of his *Inferno* with lovers, and plagued them with unceasing storms of wind.

The only winds which much affect landsmen are those which have some peculiar malevolent property irrespective of their force : such as those which drive the sea over the land, or as the hot tainting Sirocco, personified in the Greek legend of the Harpies. The northerly winds deserved the reverence of landsmen chiefly because they could chase the foul Harpies back to their lair.

And so it is throughout history. The occasions on which wind unallied with water has made any deep impression on the minds of land-dwellers have always been few, and have become progressively rarer in proportion as man has improved his manner of house building. When houses were for the most part built chiefly of wood, a really great gale always left its mark ; but fortunately in this country really great gales, that is gales reaching hurricane force over the land, are of very rare occurrence. It may be that they have occurred once or twice in a century, and we have some record of perhaps the most important of them. Such, it may be supposed, was the " outrageous wind " of 1095, which " bore down in the City of

London alone 600 houses," and blew the roof off Bow Church so high into the air that its timbers in their fall "were driven 23 feet into the ground ; the streets of the City being then unpaved." It is perhaps too much to expect that the powers of the air should exert themselves to produce such picturesque effects nowadays, when the streets of the City are paved with reinforced concrete or other equally intractable substances.

There are recorded a few other storms which did serious damage by wind-force, culminating in the "Great Storm" of 1703 ; but with hardly an exception it is very difficult to say how much we would have heard of a particular gale had not the wind provoked the water to invade the land. It may be granted without hesitation, as a very exceptional case, that the "Great Storm" would have lived in history for the sheer damage it did in town and country, even had it not been felt at sea ; and yet we know that the harm it caused at sea, especially in the loss of life, was incomparably greater than on land.

The British Isles certainly experienced at least two great storms in the nineteenth century. The greater of these, on January 6th, 1839, was severely felt in Ireland, but has long since been forgotten ; the other swept Scotland on December 28th, 1879, and is remembered because, as will be described later, it blew down the Tay Bridge while a train was passing over it.

On January 28th, 1927, Britain was swept by a

really great gale. In nearly all exposed positions, from the English Channel to the Highlands of Scotland, the wind reached "storm force," that is at least seventy miles an hour; and gusts of over eighty, over ninety, and, in Glasgow, of over 100 miles an hour were measured. The casualties, caused almost exclusively by falling chimney stacks, rose to at least 100, among them being some ten or a dozen persons killed, mostly in Glasgow. Wooden farm buildings and trees were blown down, stacks of hay and straw were blown about—just as in 1703, though by no means to so prodigious an extent; while overhead telegraph and telephone wires, which seem to be the most vulnerable features of modern times, suffered severely. The toll of loss at sea was not considerable. This great gale, the heaviest experienced in Great Britain for many years, though certainly not so violent as that of 1703, had much in common with it. It marked the culmination of a succession of gales; and, like its great predecessor, it owed its great violence to the overtaking and absorption by the main storm of a secondary disturbance which it was pushing before it. And yet this storm was, to the general public, at most a nine days' wonder. Solid building ashore, and the complete prevalence of steam at sea, have robbed even the greatest winds of nine-tenths of their terrors.

At spring tides people go nowadays in motor cars to watch the Severn "bore" come in, and

debate on their way back to lunch whether what they have seen was a "good" bore or only an indifferent bore. Three hundred years ago, when protection against the flooding of the land was in its infancy, a "good" bore was a very serious matter. Given an Atlantic gale blowing home into the Bristol Channel at the top of spring tides, it was possible for a flood to develop suddenly such as would justify the preparations of Noah. And similarly with a Northerly gale driving the waters down into the cod of the North Sea, the banks of the Thames estuary might suffer in like manner, though to a less degree owing to the hills which line a great part of its shores. Forethought and labour have succeeded in preventing vital damage from such abnormal rises of the tide, merely by damming the water off the land; and it is beyond expectation that any flood can now occur in England so disastrous as that which in 1607 submerged the low-lying country of the Severn estuary.

On January 27th of that year "huge and mighty hills of water were seen tumbling one over another as if the greatest mountains in the world had overwhelmed the lowest valleys, to the astonishment and terror of the spectators, who at first, mistaking it for a great mist or fog, did not seek to make their escape from it. But on its nearer approach, which seemed faster than the birds could fly, they saw that it was the violence of the waters which seemed to have broken bounds, and were pouring in to deluge the whole land. So swift

were they that in less than five hours most parts of the counties on Severn banks were under water and many hundreds of persons drowned. From the hills could be seen herds and flocks with husbandmen in the fields all swept away together in one dreadful inundation." And from Bristol to Gloucester the banks on both sides were covered to a distance of six miles ; while round Barnstaple there was " little to be seen but huge waters like to the main ocean : the tops of churches and steeples like to the tops of rocks in the sea."

Such a disastrous flood inevitably produced its crop of curious incidents : as of the blind and bed-ridden old man who on his bed was floated out of the wreck of his cottage, and eventually driven ashore by the wind : or that the tops of the trees remaining above water should be covered " with turkeys, hens, and suchlike poultry " : or, again, of the milkmaid who was marooned for two days on a hillock, and was when rescued " half dead with fear rather than hunger and cold ; for the bank on which she stood was so covered with wild beasts and vermin, which had taken refuge there, that she could scarcely keep them from crawling on her."

Such floods are storm floods, things of wind and tide, and another thing altogether from the periodic floods of great rivers. They are more akin to the rush of the Red Sea which overwhelmed Pharaoh's host than to the periodic inundations of the Mesopotamian plain, or to the more irregular rises of

other great rivers, such as recently caused great distress in Holland, or, more recently still, put a considerable part of the basin of the Mississippi under water. Those floods are a mere matter of rain ; and they are caused more commonly by an unusual continuance of rain than by any one serious downpour meriting the name of a rain storm.

Every sailor knows that the Devil is busy in a gale of wind : landsmen prefer to think that he goes a-hunting in a thunder-storm, and Tom of Ingoldsby versified a legend to prove it. There is, however, at least one anomalous case on record. It will be remembered that a severe storm of wind blew on the night on which Oliver Cromwell died, September 3rd, 1658, and that some of the royalists put it abroad that the gale was caused by the Devil coming for his soul. The fable did not become popular, whether because most people judged that the Protector was not fair game for the Devil, or because they thought that, if he had been, the disturbance would have taken the orthodox form of a thunder-storm. But it is perhaps as well for Oliver's memory that the storm of that night was not a thunder-storm. Had it been one of those continued thunder-storms of tropical violence, like that of July, 1923, which fortunately visit this country only at very long intervals, there can be small doubt as to the turn which popular opinion would have taken.

Some twenty years ago a naval officer, who has

since become widely known as a meteorologist, proposed an ideal cruise. He would like, he said, to have a staunch schooner yacht, to fill her up with scientific instruments, and to cruise round the world looking for gales. When he found them, he would busy himself in observing their peculiarities while the other fellow took charge of the ship. The other fellow said that he thought a little of that sort of thing would go a long way, and mentioned the proverb about the pitcher which went too often to the well ; adding that it wouldn't be worth the risk, and the gales would become monotonous, for—allowing for differences of latitude, and therefore of temperature—they were all pretty much alike. But the enthusiast was not satisfied : Redfield, Reid and Piddington, who between them worked out the “ Law of Storms,” had made a very good start, but the opportunities of each were strictly limited. For himself he wanted to sample all the gales that blew.

The way to set about it, he said, would be to leave England early in the year—one might begin by looking for a north-wester in the Bay to shake things down a bit ; then go up between the Faroes and Greenland, where it blows quite often and quite hard ; then into the Gulf Stream, which would certainly provide at least one good gale, probably off Hatteras ; and by that time one might get down to the West Indies for the hurricane months. A really good thunder-storm might turn up anywhere in the tropics, or it might be

found as far south as the River Plate when the ship went down there to sample a pampero. It wouldn't do to go west round the Horn, because no ship could make a passage across the Pacific without going north into the fine weather of the South-East Trades, which would be dull. The better plan would be from the Plate to get well down into the forties, or even down to the ice, and to come north at the Cape in order to enjoy the best the wind can do against the Agulhas current.

Then to the neighbourhood of Mauritius for an Indian Ocean cyclone ; after that to the China Seas for a typhoon ; and so home by way of Cape Horn, making a point of looking for one of those very special north-westerners which are nearly always to be found off Cape Pillar. After passing the Falklands it would be an ordinary ocean passage home, though one might go over to the African coast to pick up one or two of those jolly little tornadoes. It would hardly be worth while going into the Mediterranean, though to be sure in the Gulf of Lyons and the Northern Adriatic it sometimes blew hard enough to blow the Devil's horns off ; but one might have to wait a long time for a really good specimen. It would be easy enough to find a Levanter no doubt ; but a Levanter as a rule only blew hard enough to be a nuisance, and rose to storm force only once in a way (as, for example, in the spring of 1927). If the last lap was made early or late in the year, it might be possible to top up with a really good gale in the Channel.

Needless to say, no one ever did make a cruise of that description ; nor, if he announced his intention of attempting it, is it likely that the underwriters would look at him. One way or another the vagaries of all these types of storms, and more, have been put on record ; but having met with one or two of them, most men are content for the future to avoid them so far as may be. It is true that the sea takes a far less toll of large steamers than it used to do of sailing ships, which, even at their biggest, were very small by comparison with existing ships ; but the recent overpowering of the *Antinoe* by a North Atlantic winter gale, and of H.M. Sloop *Valerian* by a West Indian hurricane, are reminders that even to well-found ships with powerful engines the wind and the sea can still be dangerous.

The mention of man's wish to avoid storms at sea introduces the " Law of Storms," which fundamentally is extremely simple. Redfield in 1831, by plotting a large number of observations, succeeded in showing that the hurricanes of the West Indies were whirlwinds moving on curved tracks. His successor, Sir William Reid, an officer of Engineers, was also attracted to the study of the subject by the West Indian hurricanes, and from his studies evolved the " Law of Storms," which he published in 1838. Henry Piddington, who next took up the work, was a master mariner familiar with the storms of the Indian Ocean and the China Seas, which, after the publication of Reid's " Law,"

he studied in the light of its principles. Thanks to these men it is established that all the seemingly irregular winds, whether light fine-weather winds or gales of hurricane force ; whether in the tropics or the Arctic ; whether accompanied by a clear sky, by rain, by snow, or by thunder, are all manifestations of the same law. They all revolve round a centre, forming a whirlwind which may be anything from 3,000 miles in diameter, as in a great Atlantic "depression," to a few yards, as in a tornado or a water spout. And the whole system, whether large or small, moves bodily along its appointed path just as an eddy moves down stream in a swift-running river.

It was discovered at an early date that, by observations of the force and direction of the wind, and of the movement of the barometer, made at a single station or on board a single ship, the observer was able to deduce the approximate position of the storm centre and the track of the storm. Forearmed with this knowledge ships would, in very many cases, be able to decide what course to steer in order to avoid the worst of the gale.

That was the theory ; and scientifically there was no flaw in it. Practically there were difficulties. To begin with, seamen of the days before Board of Trade examinations were thought of were a conservative race. What was good enough for their fathers was good enough for them. They were not going to run away from gales. Every

seaman knew that there were gales, and that he must take the rough with the smooth. Besides, if he did behave in the silly way the books recommended, and ran away out of his course because the barometer fell ; and suppose, in the result, he did not feel a gale at all ; how then was he to know that there had been a gale ? A pretty fool he would look when, with no gale in his log, he had to account to his owners for the delay caused by running a long distance off his course. Seamen said this, and more, to Piddington, who found them unsympathetic.

It is perhaps true to say that the experiences of the brig *Charles Heddle* and of the troopship *Maria Somes*, both in the Indian Ocean in 1845, served as the glaring examples needed to prove the rule in the eyes of those who would not see. The *Charles Heddle*, overtaken by a cyclone of hurricane force near Mauritius, put the helm up and ran before the wind. What she should have done when it became evident that a hurricane was coming on, was to decide from observations the position and path of the storm centre, and then to steer on a course (laid down by rule in the text-books) which would take her out of its way. Running before the wind carried her eventually right round the centre, always in the same violent wind ; and because in these storm systems the wind does not blow truly round the centre, but curves inwards a little towards it forming a spiral, thus the track of the *Charles Heddle* was a spiral about the centre.

At the end of her first circuit she was a little nearer to the centre than she had been at the beginning, and the wind was a little more violent. She continued to run as she had begun, dead before the wind, going round and round the storm centre, in great danger all the time, and suffering heavy damage. In the course of three days she succeeded in running no less than five times round the centre. Then, providentially, the storm left her.

Whether any other ship has ever done the like is not known, but at least if she has attempted it she has not come home to tell the tale. Not the least wonderful part of the *Charles Heddle's* wonderful story is that the ship survived.

But instead of running madly round the storm centre, or of steering a safe course out of the way, a ship can do a third thing. She can lie to—that is, stop where she is—and see the storm out on the spot. With very large storm systems, such as are common in the “forties” of either north or south latitude, this is the best course, and there are rules provided as to how best to do it. But the men of old, who knew no distinction between storms, treated all alike. If the weather grew too heavy for them to hold their course, they hove to in the face of a hurricane or of a typhoon, each of them a disturbance of very limited extent, just as they did in a great gale in the temperate zones, where the stormy area might be 1,000 miles or more in diameter. Men who behaved thus right in the

track of a hurricane—or typhoon, or cyclone : they are all the same thing under other names—stood an ugly chance of passing through the storm centre, or rather of allowing the storm centre to pass over them. Such an experience is terrific. The centre of these storms has a calm patch ; the wind falls clean away to nothing ; the sky clears in the zenith, and a blue patch, known as “ the eye of the storm,” often appears. But the sea boils like a pot in pyramidal heaps from which there is no escape. It is believed that many a ship which has survived the onset of the hurricane, and of the regular sea it brings with it, has been swamped or racked to pieces by the mountainous irregular sea of its centre. And if the ship survives the centre, she has the second half of the storm to pass through, with the wind as violent as before, but opposite to it in direction.

Mr. Conrad’s unimaginative mariner in *Typhoon* had this experience, and was, for the first time in his life, impressed by what the wind could do. Piddington in his ignorance passed through the centre of a cyclone, and was thereby moved to study the “ Law of Storms ” with highly beneficial results. Two British destroyers had the same experience a few years before the war in the China Seas, not from any doubt as to what was against them, but because they were in narrow waters where they could not do otherwise than they did. All these experiences ended well, though with danger, hardship and damage. Other ships came

less well out of such an experience, and among them the *Maria Somes*, which in 1845, having troops on board, through ignorance allowed herself to be caught by the centre of a cyclone. Apart from the damage which the ship received, the sufferings of those on board, battered down for a long period in tropical heat, were akin to those of the Black Hole of Calcutta. When the storm had passed, fourteen of the soldiers and their wives were found to have been suffocated.

There was another somewhat similar case in the same year, the Hon. Company's steamship *Pluto* putting herself in the track of a typhoon near Hong Kong. As has been noticed, the joint experiences of 1845 went a very long way towards convincing mariners that there might after all be something in the "Law of Storms."

When certain conditions are present miniature storms of great intensity but of slightly varying type occur frequently in continental climates, though probably no part of the world except the cold regions of the north and south is free from them. Storms of this type are spoken of as "tornadoes" in America and in Africa, or as "whirlwinds," when, as is more rarely the case, they form over Europe.

The "tornado," it may be noticed, owes its name to a misconception. The original name was "tronada," a thunderstorm, applied particularly to the storms which form locally on the west coast of Africa. But when the whirling nature of other



NEEDE, HOLLAND : IN THE WAKE OF THE TORNADO OF JUNE 1ST, 1927.

(From a Times Photograph.)

local storms became familiar, the name " tronada " was modified to " tornado," to suggest a derivation from the Spanish " tornar," to turn, and in its new form was applied to storms of small extent in which not thunder, but the whirling of the wind, was the chief feature.

Tornadoes, as thus defined, are often exceedingly destructive, and generally spectacular. It is no uncommon thing for such a whirlwind, travelling on a straight path, to cut a swathe through everything met with in its course, levelling or unroofing houses, tossing stacks, ricks and all sorts of small objects into the air, even at times drawing up the water from ponds and streams. To cite a recent instance, such a whirlwind passed over eastern Holland on June 1st of this year, travelling from south to north. The account given of it by the burgomaster of Neede, a village lying midway on its path, was that his attention was first called to what looked like a great pillar of smoke, suggesting a fire at a distance. As the pillar came nearer he recognised it as a whirlwind, with clouds circling about its top ; and presently he saw in the smoky pillar all sorts of objects that had been picked up by it, trees, furniture, parts of the roofs of houses, even a number of chickens. Many houses and buildings were thrown down, and it was noticed as especially remarkable that a railway truck was picked up by the wind and dashed down again. The reports did not state the width of the front on which this whirlwind moved,

but it was quite small, to be measured in yards, or at most in chains.

It is believed that disturbances of this kind are never felt more than a quarter of a mile on either side of their vortex, the weather continuing normal on each side of their track. They are of very rare occurrence in the British Isles ; but one which passed over Walmer on October 24th, 1878, was very active, behaving just as did the Neede tornado of 1927. It passed behind Dover, over Walmer, and out to sea, taking with it everything that lay in its track.

An exceptional tornado, with a front of half a mile, was experienced at St. Louis, Missouri, on May 27th, 1896. The track of this during its period of extreme violence was but four miles long ; but in this short space some 500 people were killed and 700 injured, whilst everything in its path, buildings, bridges, and trees, was destroyed. This particular tornado is stated to have begun as three separate whirlwinds which combined into one, acting in this, and gaining in violence in the same manner as a cyclone does when it absorbs a secondary disturbance. That its course of destruction was so short implies that a great part of its progress was made with its lower verge at a distance above the earth's surface.

It seems to be the case that disturbances of this nature form commonly, if not always, over large flat land surfaces ; thus in some of the States of the Union, in Iowa and Kansas for example, residents

provide against them by a special insurance and by building tornado-proof cellars or dugouts. What happens to such a whirlwind when it leaves the land and stretches out to sea seems to be still obscure.

There are cases on record in which a ship has had the masts whipped out of her, or even been upset, by the passage of a violent rushing wind aloft which was not felt upon deck ; but the seamen who have recorded such experiences certainly had no knowledge of what manner of wind it was that did the mischief. To seamen any localised strong wind is commonly a squall.

As for rain, hail, and snow, they can provide storms of themselves alone, or can combine with wind or thunder-storms.

On land all alike can work great damage, from flooding a coal mine, or causing a landslide, to plaguing a Pharaoh ; at sea rain in a storm of wind may be an advantage as, when very heavy, it has power enough to beat the sea down. Snow to seamen is far more dangerous, both from its obscuring effect, which has caused countless wrecks, and because, especially when accompanied by frost, it loads the sails and gear, preventing their being handled and thus imperilling the ship. There are cases recorded when a ship has been capsized in a blizzard because all the blocks were choked with ice or frozen snow, and not a rope could be started to relieve her. On land, on such

occasions, we hear most of traffic delayed and of sheep dug out of snowdrifts ; but on one occasion it took sixty men to shovel away the snow before a lifeboat could be launched to proceed to a wreck.

CHAPTER II

STORMS IN HISTORY

IT is a question for argument whether any storms, even the greatest, can truly be said to have "made history"; the answer to which will depend chiefly on the meaning we allow to the term history. If we give it the widest interpretation and apply it to every human activity, then the answer must be that some storms, not necessarily the greatest, have had an appreciable influence on after events; but if we speak of history in the text-book sense, considering that, like the law, it cannot be expected to concern itself with very small affairs, then we shall be forced to the conclusion that no storm has ever brought about any considerable change in the history of a nation, such as may occasionally be wrought by a great plague or by a devastating war.

This will not seem remarkable when it is remembered that not even the most severe earthquakes, which are far more destructive than the greatest storms, can succeed in diverting the course of human progress in more than a minute degree. It was, for example, calculated that the Tokio earthquake of 1923, which was probably more destructive of human life and property than any

other on record, would set Japan back at most by a twelvemonth. It may well be that tropical hurricanes have had a similar effect on particular islands—and that of 1780 devastated several islands—but those islands are small communities exercising but little influence in the world at large. To Great Britain and France, the owners of the devastated islands, the hurricane was but an incident, striking indeed, but almost without influence on the general course of events. If we compare a hurricane in its national effects to a battle, it must needs be to an indecisive battle, the effects of which are limited to the expenditure of a certain amount of blood and treasure.

The great storm of 1703 did all the damage that a storm could reasonably be expected to do. It visited the capital and the most populous parts of England, it blew with unprecedented violence, and it overtook her fleets in exposed positions. Yet it cannot be said that it had any visible effect on English history; the navy was more inconvenienced by it than any other branch of the State, but it continued to wage the French war, then newly begun, with unabated vigour, and indeed in the following year fought the one great fleet action of the whole war, on the very day which saw Marlborough victorious at Blenheim. If further proof is desired of the relative insignificance of this convulsion it may be found in the silence of our general histories. The few text-books which refer to it dismiss the subject in half a dozen

curt lines, and *The Political History of England*, a standard work in twelve large volumes, does not find space even for a bare mention.

But though it does not seem to be in the power of a storm to leave a lasting mark, it cannot be gainsaid that frequently enough a storm has succeeded in appreciably influencing the course of events ; gales of wind, as would be expected, being the determining factor at sea, and excessive or untimely rain on land. Also, from the scientific point of view, it is of interest to remember that the study of meteorology owes its origin, and at least one extremely important step in its development, to a few particular storms.

We may assume that, had Egypt lain in a hurricane region, a mighty wind would have found a place among the plagues which were sent to convince Pharaoh, but whether it would have proved more effective than the hail storm may be doubted. It would almost appear that Pharaoh's advisers could muster enough knowledge of meteorology to enable them to discount weather phenomena. There is, indeed, little of weather in biblical history. There is Noah's flood, which implies continued rain coupled with the melting of the snows in the Armenian highlands ; but this, like the Mississippi floods of 1927, must be set down as the work of exceptional conditions rather than of one individual storm. Weather, when we meet with it in the scriptures, is apt to be lyrical rather than scientific. We admire the

psalmist's interpretation of the wind and rain and thunder ; but when we find these phenomena applied to decide a battle, we could wish for something more than poetry :

“ They fought from Heaven : the stars in their courses fought against Sisera.

The river of Kishon swept them away, that ancient river, the river Kishon.”

That it rained, and that the Kishon came down in spate, seems clear, but how it was that these phenomena proved so excessively inconvenient to Sisera is not recorded. Barak probably could have told had it seemed necessary ; Deborah it is likely neither knew nor wished to know, being content to exploit the theme of divine aid.

The history of all ages affords examples of battles or campaigns lost and won, as alleged at least by the defeated side, owing to some vagary of the weather, to a storm of rain, of hail, of sleet, of thunder ; but such claims, as must be confessed, do not bear close examination. It is in every man's nature to make mistakes ; it is in the nature of most men to make excuses to cover them.

There is the case of the Trebia, the first great battle fought by Hannibal in his invasion of Italy. The defeated Romans, we are told, had forded the swollen river, and were chilled to the marrow on its bank by sleet borne on an icy blast from the hills. But the rain, and the sleet too for that matter, fall alike on the just and unjust. It was

by an error of tactics that the Romans forded the river, when they had an equal opportunity of luring their enemy across. It was by their own error that they started the day fasting and waited under arms in the cold and wet, while the Carthaginians remained breakfasting by their camp fires or in their tents. How then is the blame for the defeat to be apportioned between the weather and the Roman general ?

Even less can be said for the thunder-storm which broke over both armies before they joined battle at Crécy. Was it incumbent on the French, or rather on their mercenaries the Genoese, to allow their bows to be wetted with the rain while the English kept theirs dry ? And if the English fought with the advantage of the setting sun behind them, was it by their initiative that the battle was engaged that evening ? And this mention of the level sun, a factor common to fights ancient and modern, by land and sea, serves as a reminder that there are other natural phenomena of far more frequent occurrence than opportune storms, such as darkness and mists by land, or tides and shifts of winds at sea, which have often helped to decide the day between opposing forces. But that commander is always likely to draw the greater advantage from them who is the better equipped with foresight and forethought.

So, too, at Agincourt. There had been heavy autumn rains, such as may by courtesy be called

storms of rain, and the ground was sodden. The French horses stuck in the mire and were shot down with their riders ; and the French men-at-arms who essayed to attack on foot could scarce drag their feet through the mud. But it was the French who chose the field of battle ; it was the French who delivered the attack ; it was the French who sat their horses all night in the rain and were weary men at dawn ; and it was still the French who made what remains as perhaps the greatest tactical blunder in the whole of history. Again, how much blame for the defeat can fairly be laid on the weather ?

There has been, however, at least one occasion on which a storm did have a direct effect on military operations, not by giving the victory to one side or the other, but by bringing them to a close. This was in the early spring of 1360, when Edward III. was besieging Paris and the French were offering to negotiate for peace. Edward preferred active measures ; but in the middle of April it became apparent that the city was too strong to be taken, and at the critical juncture there came a devastating thunder-storm with hailstones that slew man and beast. The chronicler's estimate, which places the English losses from this storm at 1,000 men and 6,000 horses, may well be an exaggeration ; but modern historians accept it as a fact that the storm, by destroying Edward's baggage train, crippled his army to such an extent as to convince him that negotiation was the better

course. The treaty of Bretigny may, therefore, be regarded as the direct result of the storm. That the treaty was ill observed and of no long continuance was nothing exceptional in that age, and cannot be taken as implying any lack of efficiency on the part of the hailstones.

But, naturally enough, it is on operations by sea that storms have most frequently exercised an influence ; so frequently indeed that it probably would be difficult to find a single campaign in which the plans of one or other admiral were not in some measure disconcerted by gales of wind. Yet this very frequency brings with it its own remedy. It ensures that all reasonable precautions against stormy weather are taken, both in employing ships fit to keep the seas, blow high, blow low ; or, alternatively, in withdrawing from the field of operations such ships as would be endangered by the weather likely to be found there. It was very late in the history of sailing ships, in fact not until about 100 years before sails gave way to steam, that the greatest men-of-war were accounted fit to keep the seas in the winter season. The three-decked ships, or the " great ships " as they were commonly called, were much more susceptible to damage than their smaller sisters, and until the middle of the eighteenth century every effort was made to have them safe in port before the autumn gales began. It was one of the most remarkable features of the great storm which swept England in 1703 (of which

more presently) that it spared, though by the narrowest of margins, the great ships which it caught at sea ; but, on the other hand, in 1744 the *Victory*, of 100 guns, the largest and newest first rate in the navy, vanished completely in an autumn gale in the Channel, taking down with her Admiral Sir John Balchen and 1,100 officers and men. And yet within a few years after this tremendous event the "great ships" were not only keeping the sea in the winter season, but were doing so without suffering disproportionate losses. How far the credit for this change lay in better construction and equipment, and how far it should be sought in the improved seamanship of the officers and crews, has not been, and perhaps cannot now be, exactly decided.

One thing, however, that stands out conspicuously in naval history is that throughout the sailing era gales of wind continued to take a heavy toll of the ships employed. It would seem to be the case that no increase of skill, whether in building the ships or in handling them, had any appreciable effect in reducing the losses incurred from gales in time of war ; an apparent contradiction which is explained by the reflection that the burden was always proportioned to its bearers, and that the more the ships and men proved able to do the more was demanded of them.

One result of the continual battling with foul weather in exposed situations was the somewhat curious one that even an exceptional gale of wind,

even a hurricane, left very little mark. There was a constant yearly average of losses from stress of weather and from the risks of navigation inseparable from war service, and even a hurricane did not greatly raise the average. It may well be that this was so, in great part, because by constantly facing foul weather the ships' companies became such expert seamen that even the worst of weather could not overcome them. From the middle of the eighteenth century onwards we hear of very few cases of ships, other than small craft, overpowered by storms ; ships indeed were lost in plenty, but nearly always because their duty, or accident, took them so near the shore as to put them in great danger from the land in the event of an on shore gale. Sometimes, too, ships were lost in the open sea because they were not fit to be there, because, by the exigencies of the service, they had to be kept at sea at all risks when ripe for a dockyard. Such ships perished by, or narrowly escaped from, storms, as will appear in later chapters ; but over them the winds and waves had no fair victory. It may indeed be questioned whether by the end of the eighteenth century any well-found ship of the line or frigate was not storm-proof in the open sea. She might lose her masts and be forced to return jury-rigged to port to refit, but that she could be overwhelmed by the sea had become so contrary to experience as to be unthinkable. In the few instances where ships vanished completely there was always a

strong presumption, virtually amounting to a certainty, that they had perished by fire, by shipwreck on some unknown coast, or by some other of the recognised perils of the sea, rather than by mere stress of weather.

But this is the latter end of naval history. In its early days ships of war were not sea-keeping. Fleets could go campaigning only in fine weather, and if they met with a sudden storm they suffered severely. Even when the combatants were, so to speak, next door to each other, as were the several states of ancient Greece, disasters were by no means uncommon; but when in order to approach its enemy a fleet had to make a long sea passage, they became the rule rather than the exception. Thus it was in the Persian wars. The first Persian attempt to invade Greece was defeated by a storm which wrecked the fleet of Mardonius at Mount Athos; and again, in 480 B.C. the Persians suffered very severely from storms, their losses being so heavy as probably to be the reason why they failed to defeat the Greeks at Artemisium. And had the Greek fleet been crushed there, there would have been no battle of Salamis, and the course of the war would in all likelihood have been radically different. It would seem that the chapter of sea accidents helped to save the Greeks from a very great danger.

There were similar losses in the wars between the Romans and Carthaginians, the greater share of them falling on the Romans as being the less expert

seamen ; that the ultimate victory lay with the Romans goes far to show that even the loss of a whole fleet amounted in those days to no more than a temporary disaster. And so it was throughout the epoch of galley fighting, for the reason that the individual ship was small and light, and therefore easily and quickly replaced. Even in the latest age of war on a large scale between oared craft the same rule held good, that a fleet destroyed by whatever cause could be replaced ; and this was shown by the unprecedented victory of the Christians over the Turks at Lepanto. The Turks were not crushed by their defeat. When the Venetian ambassador referred to the battle as affording a base for negotiation, the Sultan scouted the idea. " The loss of a fleet," he said, " is as the shaving of the beard. It will grow again." And he spoke truly ; for after a winter spent in shipbuilding, the Turks were able to take the sea with a fleet 250 strong.

When, however, the sailing ship replaced the galley as the capital ship, conditions were potentially altered. The size and cost, and consequently the effort required to replace a lost ship, were so greatly increased that the loss of a whole fleet would be likely to determine the issue of a war. This altered condition of things began in the sixteenth, but cannot be said to have been complete till the latter part of the seventeenth, century. The effect of the change was, however, rather theoretical than actual, for ships had become so

much more capable of withstanding storms that the destruction of a whole fleet was no longer to be expected. The nearest approach which was ever made to such a disaster was in 1588, when half the Spanish Armada perished ; but, as will be shown further on, other causes than gales were accountable for most of its losses. But these losses, however incurred, were exceptionally severe. The cost and delay of replacing them left the Spaniards virtually impotent at sea for a period, though for a shorter period than might be expected. Three years later they were able to take the sea with a new fleet, greater than any that Elizabeth had in commission that year, and to win the barren success of the capture of the *Revenge* at the Azores. On this occasion, too, they suffered severely from a storm, a greater storm than any they had met with in 1588, and again they suffered heavy losses. But though these losses weakened them, they were not decisive, for the war against England continued to drag on for another dozen years, and that with the Netherlands for very much longer.

There was another very conspicuous example of the intervention of a storm during the first war between England and the Dutch. In the summer of 1652 the rival fleets under Blake and Tromp went north, each for its own reason, and found themselves in presence with each other off the Shetlands. But before battle could be joined a severe gale swept down upon both fleets. By the luck of the direction of the wind the English had



OFF BALACLAVA: THE GALE OF NOVEMBER 14th, 1854.

(From a coloured Lithograph in the Macpherson Collection.)

the shelter of the land and suffered relatively little ; but the Dutch, who were exposed to the full fury of the wind and were on a lee shore, ceased for the time being to exist as a fleet. Many of their ships were wrecked, the rest were scattered and disabled, so that nothing remained for Tromp but to make the best of his way home.

This was as severe a trial as a fleet could reasonably be called upon to undergo, but it was in no way decisive. Within two months the Dutch had their fleet at sea again, and were able to fight a great battle, to be followed two months later by another, and in the following year by a whole sequence of great sea-fights. The most, therefore, that can be said of the storm is that it weakened their navy somewhat, and to that extent prejudiced its chances of success in the battles which were to come.

On the other hand, it has happened that a storm has had an appreciable effect on a campaign by robbing the stronger side of almost certain victory. This happened in 1744. In that year the French began their war with England by a project of invasion. An army and transports were collected at Dunkirk, and a fleet was sent up Channel to cover its passage ; and this fleet believed it had succeeded in passing by the English Channel fleet under Sir John Norris and leaving it at the Isle of Wight. The French were misinformed. Norris had in fact passed unobserved up Channel to the Downs with a superior force, and thus when the

French anchored at Dungeness on February 23rd, they were, though they did not know it, in a position of great danger. Next day the English came in sight, but owing to the baffling nature of the wind were not able to approach within eight miles. At a council of war the French decided that it was time to be gone, and that they must weigh that night as soon as the tide served. The English, of course, would have weighed at the same time, and could not have failed to intercept the enemy's flight.

It was at this juncture that a severe gale arose suddenly from the north-east ; such a gale as not only put fighting out of the immediate prospect but was fair for the retreat of the French. They ran before it helter-skelter, and thereby were able to return safe to Brest. The invasion had to be "postponed," and, as always happened to postponed projects for the invasion of England, did not take place. On the other hand, it would not have taken place had the French fleet been defeated ; but in that case the war would have gone better for England, instead of dragging on unsatisfactorily, as it did for three years and more from the want of a victory at sea. It may, therefore, truly be said that this gale was of very considerable advantage to the French, for, contrary to the way of gales, it was the saving of their fleet.

Other sea battles have been prevented by inopportune gales, but none perhaps of which the

event could be so clearly foreseen as in the example last cited. Such an instance was the separation of the fleets of Howe and d'Estaing off Rhode Island in August, 1778, by a gale which drove both sides into port to refit ; and other similar cases occurred. Indeed a gale of wind most commonly produced its effect on naval war rather by preventing battles than by helping to decide them. Once a battle was joined a calm, or a shift of wind, was much more likely to prove an important factor than the arising of a storm. A storm, or even a moderate amount of bad weather, might "mar alike the Armada's pride, and spoils of Trafalgar," and did so on many more occasions than the poet needed to mention. A hurricane sank Rodney's lame ships and prizes in 1782 ; an ordinary strong breeze made it impossible to keep the damaged *Warrior* afloat after Jutland.

But though storms have rarely had great effect on the result of a campaign, and still less on the issue of a war, they have produced various results of some importance. For example, the hurricane which sank Rodney's prizes deprived us of the *Ville de Paris*, the Comte de Grasse's flagship. The importance of this went far beyond the loss of an inspiring trophy, for the *Ville de Paris* was not only a ship of the largest and finest type then existing in the French navy, but was the only French ship of that class which we captured during the war of 1778. It was the custom of the ship-builders of all nations, and at that time especially

of the English, to learn what lessons they could from a study of prizes taken from the enemy ; and there can be no doubt that, had the *Ville de Paris* been brought into port, she would have been used as a model for the improvement of English first rates. But she was not brought in, and as it chanced we captured no other first rate from the enemy till 1793, when the great *Commerce de Marseille* was brought from Toulon. This ship had the influence on British construction which the *Ville de Paris* might have had, and helped to give us the first rates of increased size and force which began to join the fleet after the war with France was renewed in 1803. But for the loss of Rodney's flagship we might well have had such ships when the war first broke out in 1793 ; and who may say what advantage we might not have drawn therefrom ?

These naval and military examples may be concluded with one from a conjoint operation, the invasion of the Crimea in 1854. The invasion began in September, and in little more than six weeks it became apparent that Sevastopol was not going to be taken easily, and that a winter campaign was therefore in prospect. The harbour of Balaclava, the only supply base which the English had in the Crimea, was inconveniently small, so that many ships were habitually anchored off the port till berths could be found for them inside. Also the few weeks of campaigning had revealed grave defects in the supply services of the

army : there was delay and confusion in issuing the stores on the spot, added to which there was a great lack of many essentials. It will serve to mark the period and to indicate what the condition of affairs was in the beginning of November if we recall that Miss Nightingale arrived at Scutari on the 4th, and that the battle of Inkerman was fought on the following day.

The failure of the commissariat had already been laid bare at home, and in preparation for the winter campaign, supplies, especially of warm clothing for the troops, forage for the transport animals, and ammunition had been sent out. The ships carrying these stores were lying outside the crowded harbour of Balaclava on November 14th when a severe gale, so severe as to be frequently spoken of as a hurricane, came on. It was accompanied by heavy rain which afterwards turned to snow.

A greater misfortune could hardly have occurred. The newly arrived transports attempted to crowd for refuge into the already congested harbour. Such as got in did much damage among the shipping already there ; many were wrecked on the coast, and among them the ships loaded with the most essential stores. The English men-of-war rode out the gale steaming ahead at their anchors, but one fine French line-of-battle ship and other vessels were lost. But the damage which most prejudiced the future of the campaign lay in the wreck of the transports. To the loss of

the warm clothes, and of a ship-load of forage, a great part of the misery which the troops had to suffer through the oncoming winter are to be ascribed. The winter proved unexpectedly severe, and the troops, illclad and not too well provisioned, were worn down by the necessity of constant fatigues, caused by the loss of the forage and the consequent death of the transport horses. With wet and cold, sickness, excessive labour and short rations, 8,000 British troops were in hospital by the end of November, and the numbers increased through the winter. The Tsar spoke truly when he foretold that Generals January and February would fight for him. By the end of the winter barely half the British army remained effective.

But great as was the misery caused by the storm of November 14th, one good result sprang from it. The disaster drew general attention to the need of being provided, as far as possible, against such events, and came to the assistance of those who were already advocating the collection of data and the publication of weather reports and forecasts. The development of telegraphy had already made the collection of the results of observations possible, and this gale provided the occasion that was needed. The issue of weather forecasts began almost immediately both in France and England.

The study of weather-lore owes more than this to exceptional storms. It was not until the beginning of the nineteenth century that men began to consider whether storms might not be subject to

some sort of laws, their attention being drawn to the subject by the terrible havoc caused by the hurricanes of both the East and West Indies. The American Redfield, who had experience of the West India hurricanes during their passage up the south-eastern coast of the United States, set himself to collect data from which to plot their formation and their course ; and was followed by Colonel Reid, of the Royal Engineers, who was induced to study the subject by the ruin worked by the Barbadoes hurricane of 1831. Henry Piddington followed with similar observations of the hurricanes of the Indian Ocean, for which he coined the name "cyclone," which is still often applied to them. The labours of these men bore greater fruit than they could have anticipated. They revealed that outside the tropics all the seemingly irregular winds obey what is essentially the same law as that which determines the direction of the winds and the course of the storm in hurricanes. They are, therefore, the fathers of modern meteorology, and the storms on which they founded their argument deserve to be considered as historic storms.

CHAPTER III

THE ARMADA GALES

THE defeat of the Spanish Armada of 1588, like most other great events in history, is overgrown with a plentiful crop of legends, and, as is often the case, it can be shown that many of these legends had their origin in contemporary propaganda. It was the fashion of the age to lay great stress upon religion; therefore attempts were freely made to convince popular opinion that the war with Spain was fundamentally a religious war, that Philip was the right hand of Antichrist, and that the Lord of Hosts was on the side of England and of the true faith. We have had recent demonstration that in war-time some governments can be unscrupulous, and peoples credulous; in the sixteenth century there was more credulity and less scruple than in the twentieth. The outstanding example of this in connection with the 1588 campaign was the contemporary statement, which grew into a persistent tradition, that the Armada came well provided with Inquisitors, and all the paraphernalia of the Holy Office, for the benefit of heretic Englishmen. This legend, if it did not start there, was at least popularised in the camp at Tilbury in the preaching of Essex's

chaplain, and may, therefore, fairly be written down as a piece of deliberate and unscrupulous propaganda.

The legend that the defeat of the Armada was due to storms rather than to force of arms is on a different footing. It seems to have sprung up spontaneously, perhaps in the Low Countries sooner than in England, for it was in Holland that the contemporary medal was struck with the inscription, "*Flavit et dissipati sunt*"—"He blew with his winds and they were scattered." This was a comfortable thing to believe, both as showing that the Protestant powers were under the direct protection of the Almighty, and because divine aid would be an agreeable substitute for swollen navy estimates.

Until the end of last century the belief in the efficacy of these gales continued to hold the field, and it needed a special effort on the part of the most careful of naval historians to declare the truth. Having gone to the fountain head, to the contemporary official reports, English and Spanish, for his information, he wrote :

"From the religious point of view such a representation is childish ; from the historical it is false. False, because the Spanish fleet, after being hounded up Channel, had sustained a crushing defeat from the English, a defeat in which they lost many ships and thousands of men before they fled to the north ; a defeat so terrible that nothing could induce them to turn on their pursuers ; a

defeat which forced them into a headlong flight into the unknown dangers of the northern seas, rather than face the more certain and now known danger of the English shot. Childish, because in affairs of State Providence works by recognised means, and gives the victory not by disturbing the course of nature and nature's laws, but by giving the favoured nation wise and prudent commanders, skilful and able warriors ; by teaching their hands to war and their fingers to fight."

This statement adequately summarises the whole matter, but it leaves room for more detailed inquiry into the precise causes of the utter ruin which fell upon the Armada after its defeat.

It would have simplified the inquiry had the Spaniards used an intelligible terminology in speaking of the wind ; but they did not do so, any wind stronger than they liked being to them a *tormenta* or a *temporal*. The dictionaries translate both these words by " storm, tempest," which in the majority of cases is a gross overstatement. Naturally we could not expect to find a nineteenth-century Beaufort scale of winds, with its ascending scale of breezes and gales reaching at its upper limits to a " storm " and finally to a " hurricane," in use in the sixteenth century ; so that the best that we can do when we find one side complaining of the weather is to see what the other side made of it.

Now it will be remembered that the Armada, after a false start from the Tagus, was scattered

by a *tormenta* and put into Coruña to refit. While it lay there the English fleet under Howard and Drake crossed the Bay of Biscay with a fair wind to attack the Spaniards at home, and had arrived within about 100 miles of Coruña when the wind came to the southward and westward, foul for their purpose; and as their shortness of victuals would not allow them to remain where they were till the wind came fair again they came back home. From the English side we hear nothing of a storm, or of anything approaching a storm; but Spanish ships meeting the same wind logged it as a *tormenta*.

The Spaniards sailed from Coruña on July 12th, and on the 17th, being then near the Scilly Islands, they had another *tormenta* from the W.N.W. with heavy rain, and "the sea so high that all the mariners said that they had never seen the like in July." The Armada was scattered, and after "the most cruel night that ever was seen" took a couple of days to reassemble into one body. Sir John Hawkins, in describing this experience of the enemy, wrote that "a little flaw took them," from which we are probably justified in deciding that the wind blew about force 6, a "strong breeze," or perhaps 7, a "moderate gale," as measured by the Beaufort scale. Nowadays meteorologists and seamen refuse to recognise a No. 7 breeze as being a gale at all.

We are not concerned here with the series of battles between the fleets which began off Plymouth on the 21st and culminated off Gravelines

on July 29th. All that time the weather was either moderate or fine, and the Spaniards had a fair wind up Channel. When the fighting was done the wind veered to the northward of west and blew fresh, putting the leewardly Spanish ships in great danger of being driven ashore on the Flemish banks; but the more weatherly English ships seem to have had no difficulty in keeping out of danger. And here the Spaniards had all the luck of the weather; for when they were in 6 fathoms of water, when their pilots had declared that nothing but a miracle could save them, and they were busy supplicating all the saints for aid, the wind backed suddenly into the S.S.W., allowing them to steer freely off the land into the open waters of the North Sea.

They had lost nine of their great ships, and all the rest of them were shot through and through with the loss of many men; they had failed to get in touch with the Spanish army under Parma which they were to escort from the Netherlands to England; and, though the English did not know it, they had exhausted their ammunition and were woefully short of victuals and drink. The question was how best to return to Spain, whether by the Channel or north about round Scotland and Ireland. A Council of War held on July 31st decided to return home north about; and as the wind continued south-westerly and blew fresh, north they went perforce with the English at their heels. There was no more fighting. The Armada

was manifestly beaten and in full flight ; and the English fleet, after shepherding them as far to the northward as the Firth of Forth, turned back on August 2nd, and in five days reached the Thames and Downs. It has not been noticed that if the English fleet could make this passage south at what was for those times a very fair speed, the Spaniards also had a fair wind, had they dared to use it, to carry them back south. Their own accounts confirm this belief, for after reaching 58° N., which is beyond the Moray Firth, on August 8th, they met with a head wind and sea which held them for two days ; and a wind that was foul for their going north was obviously fair for their passage south. On the 10th they got as far north as 60° , and having rounded " the last isles of Scotland," seemingly on the 11th, they steered for Spain with a N.E. wind.

An official report from Flanders stated that the Duke of Parma, having embarked the greater part of his army on July 30th at Newport, finished embarking the rest at Dunkirk on the 31st, on which day he received advices " that a storm (*temporal*) had forced the Armada to run." The 29th was the day of the great and decisive battle of the campaign, and the storm which broke upon the Armada on that day was one of iron and lead.

As to the course followed by the Armada on its return to Spain, we know that Medina Sidonia's orders were that it should go clear of Shetland, standing north till it reached $61\frac{1}{2}^{\circ}$, before it

altered course for Spain. It was then, by his orders, to steer W.S.W. till it came to 58° , from which point it was to go S.W. to the latitude of 53° , and thence was to shape its course for Finisterre. No one would find fault with the course ordered. It gave the Shetland Islands a berth of thirty miles, it passed wide of the western Hebrides, and did not alter to the S.W. until it was clear even of Rockall; and finally it passed some 500 miles west of Ireland. Any ship which succeeded in holding even approximately to that course would be safe from all dangers save those of wind and wave. It would ensure their "doubling the cape," that is Cape Clear, at a very respectful distance. Cape Clear was a veritable bugaboo to Spanish seamen, and indeed of no small repute with the English. It was an Englishman who wrote of it, "Cape Clear, where the ocean sea raiseth such a billow as the greatest ship may scarce endure"; and the Spaniards, with their very limited knowledge of northern geography, pictured Ireland as prolonged to the westward in a great and tempestuous cape which was Cape Clear. Let that once be passed and all would be well.

Juan Martinez de Recalde bore the reputation of the best Spanish seaman of his time, and it is certain that he knew something of the pilotage of south-western Ireland. Thus of the many who made the Irish coast, it was only Recalde, and the few who followed him, who succeeded in drawing any advantage from it.

The Armada went as far north as 62° , where it was so cold that, as was recorded on board the flagship, all their negroes and mulattoes perished ; but it held together very well until it was past the northern islands, which is to say until it had left the war area. What happened to it afterwards might affect the future of the war, but could no longer affect the issue of the campaign of 1588. That was already decided.

Medina Sidonia wrote to King Philip on July 20th, when the fleets were on the point of meeting. He did not write again until August 11th, on which day he cannot have been far from Cape Wrath, and his letter gives a valuable picture of the state of the Armada and the reason for its flight : “ This Armada was so destroyed and routed that it seemed that I could best serve your Majesty by saving it, even though that should be by running so great a risk as is involved by a voyage of such length and in so high a latitude ; moreover, as we had expended our ammunition and lost our best ships, and had seen how little could be done with those which remained ; also because the fleet of the Queen was so much superior to this fleet in its manner of fighting, seeing that its force lay in its great guns and its ships were so able of sail, while ours were superior only in their small arms, which could avail us little as the enemy would not close with us . . . ” The Council of War decided they must make the best of their way home. The Duke added that as victuals were scarce in the Armada,

and the way long, he had put the whole fleet, irrespective of persons, on the same rations, viz., a half a pound of biscuit, a half pint of wine, and a pint of water per man per day, and nothing else. To save water the horses and mules which were in the storeships were ordered to be, and were, thrown overboard. They would have done better to have eaten the horses, and the mules too if they could have stomached them.

Before we follow the Armada into the Atlantic it will be well to summarise the disabilities from which it suffered; then it will be possible to judge what sort of storm was needed to ensure its destruction.

We have seen already that the ships had been smashed by English shot, that they had lost many men killed in action, and had hundreds of wounded on board. There was also much sickness, as was usual in the ships of that age: fluxes and fevers, or calentures, were the names then given to the diseases prevalent on ship-board; dysentery, typhus and enteric are what they would be called nowadays. And for all alike, wounded, sick and well, there was a starvation diet with a month's journey before them. Hunger and thirst were soon added to the other causes of death, and the ships went on their way throwing their dead overboard at an increasing rate. An average of three or four a day for each big ship is probably a moderate estimate of the loss.

Again, for this passage the men most necessary



THE ARMADA WRECKS AT STREEDAGH.

Drawn by Cecil King, R.I.

were the seamen, and it was on the seamen, always too few, that the loss fell most heavily. The greatest ships of the Armada were manned with about 400 soldiers each, but only 100 sailors, and the sailors were treated as in every way inferior. The heaviest labour fell to them, and the worst of the accommodation, so that the mortality among them was great. The ships when they left Spain had barely half the seamen that the English would have thought necessary to handle them ; mid-way on their homeward journey that half must have been reduced to a quarter.

And even assuming that the seamen were competent, as no doubt some of them were, there was a further danger because the navigating officers or pilots, as they were then rated, were few in number and for the most part very ignorant. The best navigator in the sixteenth century was bad enough, for no man then—or indeed for long afterwards—could accurately determine a ship's position when she was out of sight of land. But in the whole Spanish fleet there were barely twenty pilots who had knowledge even of the journey to Flanders, and seemingly none who had ever been in the upper part of the North Sea, or round Scotland. The few who, like Recalde, had visited Ireland had at best but some slight knowledge of its south-western corner. Also such charts or maps as existed were so primitive as to be almost entirely useless ; the north and west of Scotland, the Islands, and the whole of Ireland

were so inaccurately laid down that no pilot could venture to close the land without risking his ship. The whole of the west coast of Ireland, for example, was laid down as being approximately flat, with no great projection to the westward. It is obvious that mariners coasting down Ireland, especially with the winds hanging everywhere westerly, would get an extremely unpleasant surprise when they found the land stretching off due west from Sligo Bay some sixty miles to Erris Head. Many of the Spaniards did make this discovery, and paid for it with their lives.

As to the ships themselves, it must be remembered that the Spanish Armada was a scratch force, gathered together from the whole of Europe. The navy of the Spanish crown was, like other royal navies of the period, small in numbers, though consisting of ships individually big. Philip's idea was to supplement this force by buying or hiring all the biggest ships he could find anywhere. Now big ships, that is, ships of more than 500, or even of 300 tons, were relatively scarce in the sixteenth century, and it may be accepted as certain that in his search after mere size—which was indeed necessary to him, for the ships were to serve as transports carrying a large number of soldiers—he had to sacrifice quality. In collecting all the large ships available he had to take the old with the new ; and though we know next to nothing of the history of the individual ships of the

Armada, we are entirely justified in deciding that many of those hired or pressed into the service, whether hulks from Flanders and the Baltic, great ships of Biscay, or argosies from the Mediterranean, were old and in very bad condition from the outset.

Even apart from the question of their age, most if not all of the great ships of the Armada were very ill-suited for a dangerous navigation. Popular belief used to have it that the Armada consisted of galleons, and that these were exceedingly tubby, high, and clumsy ships. There were in fact only twenty-two galleons in the fleet of 130 ships which sailed from Coruña, and these galleons were the newest, fastest, most seaworthy, and best armed ships in the whole Armada. Judged by later and even by contemporary English standards, they left much to be desired ; but when compared with the hulks and argosies which composed the bulk of the fleet, they were efficient ships, whether for war or navigation. The English recognised this by concentrating their attack on the best galleons, which suffered losses much higher in proportion than the bulk of the fleet. The event justified their action ; for with the galeon class defeated, some taken, some driven ashore, and all shattered, the Armada ceased to exist as a fighting force. It was reduced to an almost defenceless mob of transports, and the Duke and his council knew it.

When Medina Sidonia wrote to the King on August 11th he said nothing of any ships having already separated from his flag, but, in fact, one

great ship of over 1,000 tons, the *Trinidad Valencera*, and three great hulks had done so in the night of the 8th, a night of stormy breezes. These four ships kept together until the 21st, experiencing strong head winds, which both they and the Duke's flagship called a *tormenta*, from the 16th to the 18th. One of the hulks found even this weather, which seems to have been relatively moderate, too much for her. Her seams opened, she leaked till she was water logged, her pumps were choked, and on the 21st she made signals of distress. The *Trinidad* took out her people, 180 soldiers surviving and probably a few sailors, but could save nothing else, neither victuals nor stores. The ship seems to have gone down in the open sea. The others went on groping their way and struggling with head winds, burdened with some 200 extra mouths to feed from their scanty stock of provisions.

We do not know exactly where this loss took place, or what course the ships held. Certainly they did not make the wide sweep into the Atlantic which the Duke had ordered. As they do not mention having sighted the Scottish islands it is likely that they came outside the Hebrides, and possibly their intention was to obey orders and go direct for Spain. But no mariner then could tell his longitude, and his crude methods of guessing at it often gave results which were hundreds of miles out. Thus one ship of the Armada estimated her position one day as being 100 leagues—300 miles—to the west of Ireland,

where she wished to be, and on the very next day sighted the coast of Connaught.

On the other hand, leaky ships in great distress for food and water naturally had a great hankering for the land. If only they could find a port they would be able to make some sort of repairs, and might be able to obtain water, and perhaps some sort of food. This consideration seems to have worked very strongly with a great part of the Armada, and to have been the chief cause of the many wrecks that followed. The *Trinidad Valencera* and one of the two hulks remaining with her came in on the coast of Connaught seeking relief, but seeking in vain. The remaining hulk, which can be identified as the *Gran Grifon* of 650 tons, the flagship of the squadron of hulks, had an even more remarkable fate.

On August 23rd these three ships were separated by a great *borrasca*, which blew for two days and put them in great danger. This seems to have been a real gale, such as blows occasionally in northern waters in a broken summer—as in this summer of 1927—the wind perhaps rising to a velocity of fifty miles an hour in the squalls. The *Gran Grifon* struggled on alone, making, as she thought, for Spain, and on September 1st saw the Irish coast stretching out ahead of her. She would appear then to have been standing south with a westerly wind, but as she approached the cape (which to the Spaniards was, of course, “Cape Clear,” for they had heard of no other) the

wind came southerly, off the land, and she stretched off into open water in the hope of weathering the point. It was, in fact, Erris Head.

They continued beating against head winds till September 7th, when they were in latitude 54° , that is, somewhere to seaward of Galway Bay. Here they met a great *tormenta*, concerning which the evidence is contradictory. It may be that there is some confusion of dates; or it may be that this patch of bad weather was of small extent, falling on ships near the coast, but not on the main body which was far to seaward, for there is no mention of it in the accounts from the flagship. It would seem to have been responsible for the wreck of many of the ships which had allowed themselves to be engaged with the coast. A rough coast with difficult harbours, and exposed to the ocean swell, is no place for leewardly ships, especially when they are partly disabled, and in great part unmanned by war, hardship, sickness and starvation.

The *Gran Grifon* was well to seaward when she met this *tormenta*, and though in no danger from the land, she was in imminent danger of going down in the open sea. The seams of her upper works opened, some of them a hand's breadth, and the water poured in faster than it could be pumped out. There was nothing for it but to turn the ship's stern to the sea and to run before the wind. As the gale blew from S.W. they decided that it was fair for Norway, and that they

would go thither. On the third day they were left becalmed near a Scottish island which cannot be identified from the name they gave it, but which from the observed latitude of $57\frac{1}{2}^{\circ}$ may have been one of the islets outside North Uist. There they patched their ship by nailing hides and canvas over the leaks, and then the wind came up at north-west and blew strong. This was a fair wind for Spain, and they decided that as it came in with the new moon—it is interesting to note the primitive idea of meteorology—it would be likely to hold. So back they went to the south-west, and in three days “ had recovered the latitude we had formerly gained, but in such sort that only death remained for us ; for the wind was so strong and the sea so rough that it went to the sky, tearing the ship asunder so that the people were overcome, and powerless to prevail against the water which came in in great quantities by our leaks.”

And here the wind again shifted back to the south-west, as a seaman with any knowledge of northern waters, even though he had none of theoretical meteorology, might have predicted. Again there was nothing to do but to run for it ; and they ran, passing in great danger of shipwreck by many Scottish islands. There can be no doubt that their course took them through the Minch. At last they found themselves waterlogged near an island, and were able to haul in close under it and to land their people before the ship sank.

They had, in fact, landed on Fair Island, between Orkney and Shetland, the last island on their course, and had they missed it they must needs have sunk unrecorded in the northern sea. It has always been known that this ship was lost at Fair Island, but, naturally enough, it has been supposed that she left her bones there when the Armada was rounding the northern isles about August 10th. That she had been blundering about, backwards and forwards, over 1,000 miles of sea during five weeks of blind misery is a thing that might seem incredible if we did not receive it from the men who suffered it.

It is not recorded that any other ship of the Armada ran quite so mad a course as the *Gran Grifon*, but we hear of several shifting from here to there on the Irish coast, in the hope of effecting repairs, of gaining relief, or of rescuing survivors, till Providence waxed weary of being tempted and so made an end of them. The galleass *Girona* was one of these ships. She had gained at least as far to windward as the western coast of Connaught—it would appear that she had been in Blacksod Bay—but, instead of venturing further, decided to go for Scotland. She seems to have crept round the coast, intending to go to the Clyde, but she was wrecked with all hands on the Giant's Causeway. Another ship, the *Trinidad Valencera*, was wrecked on the Inishowen peninsula, between Loughs Foyle and Swilly. She, like the *Girona*, was a long way off the course to Spain ; and this was because she,

too, had given up all hope of getting home, and had turned back from the coast of Connaught to try her fortune in Scotland. Also there was the *San Juan Bautista* of Sicily, a ship whose fate has given rise to more wild legends, and more literary dispute, than that of all the rest of the Armada put together. That she came into Islay on September 13th, and thence went on to Tobermory, where she was blown up, is now well established ; it is less well known why she was only arriving among the Scottish islands at the very time when Medina Sidonia's flagship was safe in a Spanish port. The reason is that she, too, had been on the west coast of Ireland ; but when she went for Scotland she stood boldly off to the N.E. instead of coasting round Ulster like the *Girona* and *Valencera*.

The three great ships whose wreck near Sligo with enormous loss of life is described by Captain Cuellar, can also be said to have been where they had no business to be. Cuellar possibly did not realise this, and his account of the circumstances of the wreck is more than a little indefinite. It allows us, however, to follow clearly enough the main lines of what happened. These three ships, having failed to get round Erris Head against a south-west wind, ran east along the coast of Mayo seeking shelter. It would be reasonable to expect them to haul into Killala Bay, or Sligo Bay, in either of which they might well have carried out the repairs of which they stood sorely in need. But, for whatever reason, they did not do so ; it

may be that they ran in in the dark, which would have been a terribly rash thing to do ; or the weather may have been thick ; or the wind may have drawn so far southerly as not to allow them to close the land. What we do know is that eventually they anchored two miles off shore near Streedagh Point, where they had virtually no shelter from a south-west wind, and would be exposed to the full fury of a north-wester. For four days they lay there with the wind south-westerly, rolling so heavily that they could do nothing, and then, in the ordinary course of weather, the wind flew into the north-west, dead on shore, and a tremendous sea rolled in on them. Their anchors held them very little time, and their enemies ashore spared very few of those who escaped the sea. This triple wreck, which involved the loss of more than 1,000 lives, was, after all, but one episode, a detail, of the whole disaster ; and perhaps the most remarkable thing about it—as it appears to us now—is that it was entirely unnecessary. That the pilots and officers of the ships should be ignorant, grotesquely ignorant by modern standards, of geography and navigation was inevitable ; but that they should run to leeward on a dangerous coast till they found the land trending out to bar their progress ; and that having done so they should deliberately remain in the extremely evil situation in which they had placed themselves, such proceedings argue a rashness and entire lack of seamanship not to be

excused even by a reference to the distressed condition in which the ships admittedly were.

It is not necessary to follow the fortunes of the other ships which came on the coast, or to attempt the hopeless task of enumerating the wrecks in detail. It is enough to know that of the fleet which remained after the fighting was done, thirty-four great ships and twenty small craft did not reach home ; and that most of the thirty-four perished on the coasts of the British Isles, especially of Ireland. Some of them blundered against the land because they had become separated from the flag and had lost their way ; but it is certain that the majority sought it, because they were in such intolerable distress for food and drink, and some of them so much damaged in addition, that they were prepared to take any risk rather than continue their voyage without relief.

The Duke of Medina Sidonia reached home in his flagship, the galeon *San Martin*, on September 11th. We have an account of his voyage written by an officer who was in the flagship, and, as is not uncommon with official documents, it omits much that it would be interesting or useful to know. It nowhere states what ships were with the flag ; it concerns itself very little with the direction of the wind, and hardly at all with courses, nor does it descend to details of the distress which we know existed on board. Nevertheless, we can learn from it much of value. The most important conclusion to be drawn from it is that the Duke

himself, and, therefore, presumably a considerable part of the fleet, did not sight the Irish coast at all. Indeed, there is no mention of the sighting of land during the whole passage. It may, therefore, be decided that the flagship, which was far better provided with pilots than any other ship in the fleet, adhered as closely as might be to the course laid down in the general order for the return. The result justified the order ; for, strange as it may appear, the *San Martin* made an undoubtedly good passage. The distance from the Shetlands round Ireland to Santander is at least 1,500 miles, and the general direction S.S.W., or not far from dead to windward against a south-westerly wind. The Duke passed Shetland on August 11th, arrived off Santander on September 11th, and himself went ashore, though the ship did not get into port until the 13th. This gives an average daily gain on the course of fifty miles a day, which, considering the battered state of the ship and the exhaustion of the crew, cannot be considered as other than good. From this one fact alone it is patent that there can have been little severe weather, and also that, had the whole fleet remained with the flag, it would not have suffered more than a small part of the losses to which it exposed itself by entangling itself with an unknown and dangerous coast.

Briefly summarised, the flagship's log gives the following account of the weather after passing the north of Scotland : On August 22nd the wind

came fair and held for five days. On the 27th came a strong head wind and sea, with fog ; and then from August 29th to September 1st good weather and a fair wind. On September 2nd and 3rd more bad weather, then another fair spell till the evening of the 9th, when it again became bad. On the 11th the ship made the Spanish coast, and the Duke landed in the pilot boat. A gale came on, and the ship was in some danger till the 13th, when she got into Laredo.

There can be no doubt that the gale of September 2nd and 3rd was severe. We have direct evidence of this from English, as well as from Spanish sources. Part of the English fleet was then in the Downs, and Sir John Hawkins, writing on the 5th to explain why certain things had been left undone, stated that the weather had been so cruel that no boat could pass from ship to ship. And we have an even more graphic account of it as it was at the other end of the Channel, and therefore not far from where Medina Sidonia met it with the remains of the Armada.

The Hakluyt narrative of Cavendish's voyage of circumnavigation ends thus : " The 9th September after a terrible tempest which carried away most part of our sails, by the merciful favour of the Almighty we recovered our long-wished-for port of Plymouth." And Sir William Monson is even more precise :

" I remember Mr. Cavendish, in his return in his voyage about the world, falling with our

Channel. Somewhat short of the Lizard he was taken with so great a storm as he could not make the land, and hath confessed to me he endured more hazard and trouble in two nights upon our coast than in his long navigation."

Though the date is not mentioned, the gale in question was apparently that of September 2nd and 3rd, and it may be inferred also that Cavendish must have missed passing through the remains of the flying Armada by a very narrow margin. From him, too, we gain the impression of a gale heavy enough to endanger a ship caught on a lee shore, but such as a stout ship in open water might weather without serious damage.

To summarise. The Armada, ostensibly running before a fair wind so strong as not to admit of its return south, took ten days to sail the 300 miles from the Firth of Forth to the Shetlands. The flagship, and many other ships with her, took thirty days to sail the 1,500 miles from the Shetlands to the coast of Spain. How can we believe that it was blown out of the North Sea? Or that from Shetland homewards it battled with constant head winds and storms?

CHAPTER IV

THE GREAT STORM OF 1703

BECAUSE the British Islands lie in the direct track of storms coming in from the Atlantic, there have been many great storms in English history, not a few of which have left their mark. But there is one "Great Storm," and one only, though half-hearted attempts have from time to time been made to fasten this title on other convulsions. As before the nineteenth century there was no scientific way of measuring the fury of a storm, it is only possible to judge the tempests of earlier days by the havoc which they wrought, and by the impression made by them on the minds of the men who experienced them.

Subjected to this test the "Great Storm" entirely justifies its title. It destroyed more property and caused the death of more people, both on land and sea, than any other known English storm. There can be no doubt that the wind blew with true hurricane force, and that it maintained its strength for an unprecedented time. It is not very uncommon for a severe winter gale, as, for example, that of January 26th, 1927, to develop squalls of hurricane force; but, to judge by its results, it would seem tolerably certain that

the "Great Storm" did something more than this, that in its continued violence it was a very good imitation of a West India hurricane, or of a China Seas typhoon.

Perhaps the most remarkable testimony to the wide and lasting nature of the impression made by this storm is afforded by the extraordinary success of Addison's famous comparison of Marlborough to an angel guiding the whirlwind :

"So when an angel by Divine command
With rising tempests shakes a guilty land,
Such as of late o'er pale Britannia pass'd,
Calm and serene he drives the furious blast ;
And pleas'd th' Almighty's orders to perform,
Rides in the whirlwind, and directs the storm."

"The extraordinary effect," says Macaulay, "which this simile produced when it first appeared, and which to the following generation seemed inexplicable, is doubtless to be chiefly attributed to a line which most readers now regard as a feeble parenthesis.

" 'Such as of late o'er pale Britannia pass'd.' Addison spoke, not of a storm, but *the* storm. The great tempest of November, 1703, the only tempest which in our latitude has equalled the rage of a tropical hurricane, has left a dreadful recollection in the minds of all men. No other tempest was ever in this country the occasion of a parliamentary address or of a public fast. Whole fleets had been cast away. Large mansions had been blown down. One prelate had been buried beneath the ruins of his palace. London and Bristol had

presented the appearance of cities just sacked. Hundreds of families were still in mourning. The prostrate trunks of large trees, and the ruins of houses, still attested, in all the southern counties, the fury of the blast."

There can be little doubt that this passage, and particularly the one line in it, was the making of the poem, and, incidentally, of Addison. In the fashion of that age, which seems strange to this, he was rewarded by an under-secretaryship of State; and as it seems unlikely that Addison's genius would have expanded in poverty as it did beneath the sunshine of fame and fortune, it may be held to be little, if any, exaggeration to say that it is thus to the Great Storm that we owe the *Spectator*.

It is easy to overestimate the force of a gale which comes after a long spell of fine weather; but the Great Storm enjoyed no such fictitious advantage. On the contrary, the weather in the neighbourhood of the English Channel had been exceptionally bad, with hardly a break, from the middle of November; a series of what we now know as "Atlantic depressions" passed over southern England, and gale succeeded gale, some of them being so severe that, had no Great Storm followed, they would themselves have been remembered from the loss they caused. The Great Storm stood, therefore, to be judged by the most severe standard.

From the few barometric observations of the

storm which have been preserved it appears that its centre must have passed roughly over Liverpool, and have moved across England in an easterly direction. Also, as often happens in such storms, the force of the wind was confined to the area lying south of the centre. Its greatest fury was experienced south of a line from the Bristol Channel to the Thames. It blew a very heavy gale further north ; but a direct comparison of the damage done in the Downs with that on the East Anglian coast seems to show that even fifty miles north of the Thames there was a distinct abatement of its violence, and Spurn Head is the most northerly point at which we hear of an exceptional wind-force.

On land the damage was widespread, and naturally there was a great degree of sameness in the reports which came in from all over the south country. The horror of the storm was increased by the fact that its most destructive period was confined to the hours of darkness, which, as it befel at the time of new moon, was absolute. The several reports, as is to be expected, give slightly discrepant accounts of the time when the greatest fury was reached, and of the wind's direction, but they confirm each other in the main. Thus we find that in the west country the storm was at its height at or before midnight of the 26th ; in London about 3 a.m. of the 27th ; in the Downs perhaps an hour later ; and on the coast of Holland about daylight. It would be possible from the

observations made, and especially from those made on board ship, to plot the form and course of the storm with very tolerable accuracy, but the results of such a study would have little interest save for meteorologists.

After a slight break in the stormy weather of the foregoing fortnight it began to blow again in the afternoon of the 26th, and by dark was blowing a gale. The gale soon freshened to a storm, blowing with a force approaching seventy miles an hour, and so continued during the early hours of the night. Even this was such a storm as comes but rarely, and everywhere it did damage. Tiles, coping stones, chimney pots and such like were flying about in such profusion that it was dangerous to be out of doors, and of the few that ventured some were killed in the streets. But again, the houses were so rocked by the wind that many were afraid to stay indoors, and many more dreaded going to bed. As a choice of evils most stayed within doors, and being there no doubt most went to their beds, there to sleep or to lie quaking according to the extent of their philosophy. This state of affairs played into the hands of such rogues as were hardy enough to risk the chimney pots. Just as we have records of heartless crime accompanying the Plague and the Fire of London, so, too, it happened in the Great Storm.

“ I cannot but observe here,” says Defoe, “ how fearless such people as are addicted to wickedness are both of God’s judgment and uncommon

prodigies ; which is visible in this particular, that a gang of hardened rogues assaulted a family at Poplar, in the very height of the storm, broke into the house, and robbed them : it is observable that the people cried Thieves ! and after that cried Fire ! in hopes to raise the neighbourhood ; but such is the power of self-preservation, and such was the fear the minds of the people were possessed with, that nobody would venture out to the assistance of the distressed family, who were rifled and plundered in all the extremity of the middle of the tempest."

Perhaps there were also other " hardened rogues " of whom we do not hear, who calculated their chances equally well.

The wind blew furiously for some hours, and then, when a lull might have been expected, the whole might of the hurricane was unloosed. We hear of people everywhere starting from their beds, as though summoned to the last judgment ; and indeed their accounts of the booming of the wind, like thunder aloft, are terrible enough. At St. James's the Queen rose with her maids of honour, but though part of the palace roof was blown away, no harm befel them. At Wells the bishop's palace, modernised from an old castle, suffered heavy damage. The bishop, Dr. Kidder, had his bedroom in an old part of the building. Roused by the fall of wreckage, he huddled on his dressing gown and made for the door ; but as he did so a chimney stack crashed through the ceiling, dashing

out his brains, and burying his wife, who remained in bed, in the ruins. Similar accidents were not uncommon ; but though in some cases they were fatal, in others there were remarkable, or as it seemed miraculous escapes.

Another common experience was that the lead on the roofs of churches was either rolled up by the wind or blown away in large sheets. This was reported from all over the south country ; that it bulks so largely in the accounts of damage done may be attributed to the fact that a high proportion of the correspondents who answered Defoe's appeal for information were the parish priests.

In the country, where houses stood singly, and where no doubt the majority were still built of wood, the havoc was even greater. We hear of 800 houses blown down, while barns, corn-ricks and hay stacks were demolished by the thousand. Church steeples, too, were blown down, one of them, at Brenchley, being reputed the highest in Kent. " This strong and noble structure by the rage of the winds was levelled with the ground, and made the sport and pastime of boys and girls, who to future ages can boast that they leap'd over such a steeple."

But the greatest of all the damage in the country-side was to the standing trees. That shallow-rooted trees like elms should be overturned is not remarkable, especially when we remember that the season had been wet and the ground was sodden ; but the wind was equal to greater feats than laying

flat whole rows of elms. Great oaks and beeches were snapped off through their thick trunks, and whole orchards were destroyed. A plaintive cry came from Somerset that the loss of their apple trees promised a shortage of cider.

Defoe himself made a tour to collect data for his account of the storm, and invited correspondence from all parts of the country. He says that he himself counted 17,000 trees down in Kent alone, then ceased counting from weariness. He records that there were twenty-five parks which lost above 4,000 ; and that 450 " parks and groves " lost each from 200 to 1,000 trees. The total clearly must have run into hundreds of thousands. But it may be noticed that this was not all sheer loss ; for the vast amount of damage to wooden structures stood to be repaired. Houses had to be roofed or built, barns to be rebuilt, 400 windmills had been " over-set " and needed rebuilding ; and then there was a prodigious amount of timber needed to make good the destruction of shipping. It may be doubted if much of the sound timber blown down in the great storm went to waste.

It is a well-known thing that a strong gale blowing in the direction of the flood tide into a narrowing channel will greatly raise the level of the water at the head of that channel. We have frequent experience of this in London, where a northerly gale at the time of spring tides raises the river to the top of its embankments, and even overflows some roads near the waterside. The

Great Storm did not veer to the N.W. in time to produce this effect to its full extent in the neighbourhood of the Thames and of the Straits of Dover ; but on the other side of England the furious south-west wind caused the most memorable of floods in the Severn valley. Bristol was overflowed, the water rising 8 feet above the highest level recorded ; at Chepstow they had long memories, and it was a question whether a great flood of 1607 had not been as high or even higher. And in these districts to the loss of house property, of ships and boats, and of other things which could suffer from flood as well as from the wind, has to be added whole crops swept away, and many thousands of cattle drowned.

Bristol suffered at least £100,000 worth of damage, a great part of it from the flooding of cellars in which was stored the rich produce of the West Indies and America : 1,000 hogsheads of sugar, 1,500 of tobacco, are enumerated among the losses. What the whole loss in the Severn valley may have been is probably beyond recovery. " They tell us," says Defoe, " the damage done by the tide amounts to above £200,000 ; 15,000 sheep drown'd in one level, multitudes of cattle on all the sides, and the covering of lands with salt water is a damage cannot well be estimated." We may well leave it at that.

Some curious results followed. From the great destruction of corn-ricks men might perhaps have foreseen a shortage or dearness of bread in the

ensuing winter. It fell out quite differently. By a fortunate change the season, which hitherto had been very wet, turned to dry, and for a month no appreciable rain fell. The scattered corn was therefore gathered up, practically undamaged, and threshing was put in hand at once on a large scale. This was for two reasons : both to save the cost of rebuilding the ricks, and because, owing to the great number of houses which had been unroofed, there was an unprecedented demand for straw for making thatches. Thus in some measure the storm served to repair its own devastation.

The benefit of the destruction of corn-ricks thus fell to the general public ; but it was quite otherwise in the case of houses damaged in the towns. There the public suffered as might be expected, and the building trade alone was the gainer. All the tiles made by the next summer were not enough to cover the houses which had been unroofed, and it is not surprising to learn that the price of tiles rose to three or four times the normal figure. And it was a golden time for bricklayers, who—presumably by the threat of striking, though strikes were not encouraged in those days—succeeded in obtaining 5s. a day instead of the 2s. which they usually received. In the circumstances it is not remarkable that many people refused to pay these exorbitant prices, preferring to make shift as best they could, patching their houses with boards or anything else that would serve till prices fell to a more reasonable figure.

As a curious result of the storm, it was noticed in the Isle of Wight that the fine spray of the sea, blown many miles inland, had rendered the grass so salt that cattle would not eat it ; and that hedges and trees showed on the ends of their twigs knobs of salt congealed. The same thing appeared in Sussex and in Kent, especially at Cranbrook, the old capital of the Weald ; and this implied, when allowance was made for the direction of the wind, that the spray had been blown at least twenty-five miles. This is a regular feature of West Indian hurricanes ; but it was unprecedented in England.

Several curious meteorological phenomena were observed either during the storm, or at a time so near to it that the storm gained the credit of them. It is disputed whether there was thunder and lightning accompanying the wind, and there is some excuse for the doubt which existed. The booming of the wind aloft, as heard during the lulls, seems to have distinctly simulated thunder ; and there was besides an undoubted exhibition of a most unusual nature. “ Tho’ I cannot remember,” says Defoe, “ to have heard it thunder, or that I saw any lightning, or heard of any that did in or near London ; yet in the countries the air was seen full of meteors and vaporous fires : and in some places both thunderings and unusual flashes of lightning, to the great terror of the inhabitants.” These “ unusual flashes ” are elsewhere described as not striking down, but running

horizontally along or near to the ground. That there may have been local thunder and lightning is probable enough, for an approximate reconstruction of the storm seems to show that it pushed one "secondary"—apparently a very vicious one—in front of it, absorbing it finally somewhere over the eastern Channel, and that it may have been followed by another.

The report of a waterspout seen on the afternoon of the 26th in a field in Oxfordshire also suggests the presence of an active "secondary." The Great Storm, indeed, appears to have been an amalgamation of storms.

But, as would be expected, the greatest mischief caused by the storm was done at sea. There is, for the purpose of comparison between land and sea, no certain record of the loss of life; but it is believed that on land the deaths, other than those caused by the Severn floods, were about 125, or not many more. On the other hand it was stated that the lives lost at sea amounted to 8,000, a not unlikely figure: we have pretty exact records of the losses of the navy, and know that they included some 1,500 lives.

There were two reasons why the losses at sea should be so heavy. Had all the ships which felt the storm been in open water the vast majority of them would in the ordinary course have ridden it out with more or less damage. It is hardly to be supposed that it was such a night as this that inspired Dibdin's mariner:

At night came on a hurricane, the sea was mountains rolling.

As Barney Buntline slued his quid and spake to Billy Bowline :

“ A strong nor’wester’s blowing, Bill : Hark, can’t ye hear it roar now ?

Lor’ love me, how I pities them unhappy folks ashore now.

As comfortably you and I upon the deck are lying,
Lord knows what tiles and chimney pots about their ears
are flying.”

The Barney Buntlines and Billy Bowlines who were at sea that night, even in well-found ships in open water, had enough to do without lying on the deck swapping a yarn.

But when the Great Storm began there were few or no ships in the open sea. Both men-of-war and merchantmen were at home, “ in port ” as it was called, which might be supposed to mean in a place of security, “ *statio benefida carinis*.”

Keels could trust to no place that night. Even in the Medway and the Pool of London vast damage was done ; and by far the greater part of the ships were in no such land-locked waters as those. The “ ports ” they were in were the open roadsteads where their journeys ended, preparatory to their removal into harbour. The Spithead anchorage and that at St. Helen’s were full of ships, so were Yarmouth Roads, and so were the Downs. And the Downs, as often before and since, though never to so high a degree, proved themselves a wild road.

The reason for this great accumulation of ship-

ping was that, as has already been noticed, the weather had been uniformly bad for a fortnight before November 26th. Gale had succeeded gale with hardly a break, and each gale brought ships into the roadsteads; some because they had reached their journey's end, many more, whether outward or homeward bound, because they needed shelter. Nowadays it takes some little effort to remember that in the days of sail it was dangerous to be caught by a gale in the neighbourhood of land. In the open sea a sailing ship caught by a severe gale tucks her head under her wing, so to speak, like a sea bird, and drives away slowly before the wind; but in narrow waters, as in the English Channel for instance, she has not room to do this. To attempt it for any length of time is to run a very severe risk of being driven ashore and wrecked. Therefore, in former times, ships caught by a gale in narrow waters ran for shelter, not into harbour, but into the more or less sheltered bays and roadsteads whence they could at once get to sea again when the wind came fair. Down to the very end of last century it was no uncommon thing to see 300 or 400 merchantmen collected in the Downs; and to see them sail thence all together on a shift of wind was a sight which will always live in the memory of those who were privileged to behold it.

Then we have the men-of-war to consider, and in respect of them, too, there was a very great difference between the present time and the past.

Now men-of-war are much smaller than large merchantmen ; then they were very much bigger. Now the bigger a ship is the fitter is she to withstand winds and waves. " Billows and breezes don't bother big steamers." Then, when a ship had grown beyond a moderate size, she grew progressively weaker instead of stronger.

Yet for purposes of war it was necessary to build great ships, and because these great ships could ill brook bad weather it was the regular custom to call them into port before the winter. Thus in 1703 the fleet—it was a time of war with France—which had made a summer campaign in the Mediterranean, was recalled in the autumn, and, after a stormy passage, anchored in the Downs on November 17th. This fleet was under the command of Sir Cloudesley Shovell, who four years later lost his life in a gale far less severe than the Great Storm, and, by a curious chance, in that one of his great ships which had had the most terrible experience in 1703.

A fleet of sailing line-of-battle ships then consisted, in almost equal proportions, of two and three-decked ships ; that is, of ships with two or three complete tiers of guns one above the other. Obviously the three-decker was much higher out of the water than the two-decker, and was therefore a more dangerous ship in a gale, because the wind, acting on her high side, could more easily drive her out of her course. These three-deckers were known as the " great ships " ; and it was an

accepted belief of the period that an admiral deserved to be broke who kept the "great ships" out of port too late in the autumn season. Thus when Shovell brought his fleet into the Downs, he immediately received orders how his ships were to be disposed of : some of the two-decked ships, and one three-decker, the *Prince George*, were to remain in the Downs until they could get a fair wind to take them back to Portsmouth ; but Shovell himself was ordered to sail at once for the river with seven three-deckers, one two-decker, and various miscellaneous vessels. These ships were to be laid up for the winter at Chatham.

Shovell sailed from the Downs on the 24th, and anchored at the Long Sand Head, that is, some fifteen miles at sea off Harwich. It must be remembered that then, and for long afterwards, the only known ship channel into the Thames was from the north-east, running along the Essex shore, and that, therefore, ships bound into the river had to go as far north as Harwich before turning to the south-west. This very commonly meant delay, for a wind which was fair to bring a ship up to Harwich from the English Channel was foul for her entry into the Thames. In such cases single ships or fleets often anchored off Harwich to wait for their fair wind. And this is what Shovell with his great ships did. As it was already blowing a gale he "struck lower yards and topmasts," that is, took down everything removable above deck, the usual foul weather

precaution in an exposed anchorage in winter time.

As these ships were the greatest which were exposed to the storm, it will be well to begin with their experience of it. Of the eight great ships, four were driven from their anchors and forced out to sea. The wind was W.S.W., the night pitch dark, and the Galloper sand was some fifteen miles to leeward. We have a detailed account of the adventures of the *Association*, of ninety guns, flagship of Vice-Admiral Sir Stafford Fairborne. She passed, entirely helpless, across the tail of the Galloper, in water deep enough for her not to strike, but so shallow as to render the sea marvellously high and uneven. At this point she suffered severe damage, and came within an ace of foundering. The sea beat in the ports of her upper deck, which were almost 20 feet above the water-line, and the mass of water that came aboard caused her to lie down on her side in a most dangerous position. To right the ship holes had to be cut in the decks, so that the water might run down into the hold, and be thence pumped out; but before they had succeeded thus in getting the water down to the bottom of the ship an immense weight of it collected on the lower gun deck, only some 3 feet above the water line had the ship been upright.

But the ship, in the first place, was not upright, and, secondly, she was being flung this way and that by huge breaking seas, so that this great body

of water went surging back and fore across the deck. It surged with such force that it burst the fastenings of two of the gun-ports, hinged lids opening outwards, and then the doom of the ship seemed certain. But meanwhile she had been driving over the narrow tail of the shoal, and under its lee found the sea easier ; a high and dangerous sea, of course, in such a gale, but sufficiently regular to allow men to set to work. The admiral himself took charge, and under his direction the skill and courage of his crew prevailed, the ports were barred in, and almost against hope the ship was saved.

After that she drove over to the Dutch coast, an extremely dangerous one from its outlying sand-banks. But here again fortune favoured her. By daylight the wind was not only less violent, but blew from a more southerly point, which enabled her to steer up along the coast. And so she was driven to the north-eastward, till finally she anchored at the mouth of the Elbe. After setting herself somewhat to rights she weighed her anchor for the journey back to England, but another severe gale took her and drove her still further north. In fact, so far north was she driven that it was clear that she could not get home without succour. She had lost anchors, cables, and other gear, and having just come home from abroad at the end of the campaign, she had exhausted her victuals and drink. There was thus nothing left for it but to find a northern port in which she could



THE "ASSOCIATION" CROSSING THE TAIL OF THE
GALLOPER.

Drawn by Cecil King, R.I.

refresh, and eventually she anchored at Gottenburg. Having got provisions thence, and naval stores from Copenhagen, she sailed again for home, taking with her under convoy those merchantmen which were homeward bound. It was noticed at the time that had she remained a few days longer she would have been frozen in for the winter. In that case the cold would have killed off a large proportion of her crew, which coming from a warm-weather station, and in a very sickly state withal, were as ill-prepared to meet it as men could well be. After a tedious passage home, delayed by further gales, the *Association* at last reached the Medway two months after she had left the Downs. There had been great anxiety for her safety.

The other ships which were blown off had similar but less extreme experiences. They had a rough time of it in passing the Galloper; they were driven over to the Dutch coast; but they are not recorded to have been in such imminent danger, nor were they driven so far to the northward. After some days of beating about in the North Sea in foul weather they all succeeded in returning home. It is not the least remarkable thing about the Great Storm that the three-decked ships should one and all have succeeded in weathering it. The only one which was lost was an old second rate moored in the Medway without a crew on board. The force of the wind broke her moorings and forced her ashore, and she was so rotten that she could not be got off again.

To account for the safety of the great ships when so many others, better fitted than they to cope with wind and sea, perished, it should be noticed that there was at their anchorage no dangerous sandbank close to leeward. The Galloper was far off, and though it was feared that the wind would set them on to it, yet it did not do so. Except for the broken water through which they passed, they were really at the mercy of the open sea, which, however furious, is kindlier than sandbanks. It is also probable that even in the fifty miles or so between the Downs and the north end of the Galloper there was an appreciable decrease in the violence of the wind ; it is impossible to be certain, but it is not unlikely that the great ships may have had this advantage also over those which were caught in the Downs.

The flood tide runs up through the Downs from about two hours before to four hours after high water. Its direction is roughly from S.S.W. to N.N.E., and its velocity is naturally increased when the wind blows, as it did on the night of November 26th, in the same direction as the tide runs in the Channel. Being new moon, it was high water in the Downs that night at a little before midnight. The general direction of the wind was south-westerly, but at the time of its greatest force it came a little more from the westward, blowing thus diagonally off the land and towards the Goodwin Sand which encloses the anchorage on the eastern side. These conditions

are such as bring a tremendous sea into the anchorage, and especially into the southern part of it where the larger ships lie. It is necessary to appreciate these local conditions in order to understand what happened in the Downs on the night of November 26th.

The Downs were full of ships that night. There were, to begin with, about 160 merchantmen sheltering there, lying probably in the northern part of the anchorage off Deal. Also there were many men-of-war. There was Rear-Admiral Basil Beaumont in the *Mary*, of sixty guns, commanding on that station ; there were several ships of Vice-Admiral Graydon's squadron, recently returned from the West Indies ; and there was Vice-Admiral John Leake, in the *Prince George*, a three-decker of ninety guns, with the other ships of Shovell's Mediterranean fleet ordered to return to Portsmouth. The *Prince George* was the only three-decker in the anchorage that night, and, as the night closed down dark and boisterous and the gale freshened, there can be no doubt that more anxiety was felt for her safety than for that of any other ship.

Fortunately she had a very good and careful captain, who took every precaution in good time. It is of some interest to notice that there is no mention of the ships in the Downs sending down their yards and topmasts, as those with Shovell did. As the *Prince George* did not do so, it may be decided that it was not considered advisable in

that anchorage ; probably because, as the sands to leeward were so close, and the passage, the Gull Stream, through them so narrow, it was thought necessary to be in a position to make sail at once in case of breaking adrift.

Leake's captain left a record of the storm, which was afterwards edited by his son, then Garter King of Arms. He says of it that " as it seems to have been engendered in the Downs, so it spent its utmost fury there." Of this fury, which came on about one o'clock in the morning, there can be no doubt. " That place, which the evening before appeared like a goodly forest, in two hours was reduced to a desert, hardly an object being left to cheer the sight, had the darkness of the night permitted."

About three in the morning a great seventy-gun ship, the *Restoration*, dragging her anchors came down on the *Prince George* ; but by skill the ships were prevented from beating against each other, and by good fortune the anchors of the *Restoration* did not start those of the *Prince George* out of the ground, though they damaged them. The ships rode alongside each other in this manner for half an hour, " the longest half-hour that ever they knew, for every minute seemed to be the last " ; but at length " the invisible hand of Providence relieved them [*i.e.*, the *Prince George*] ; the *Restoration* drove away, and soon after was lost with every living creature on board."

Daylight found the *Prince George* still riding

undamaged at her anchors. Few other ships had held on, and all of those were greatly damaged, most of them having had to cut away their masts. "When it was day," says Leake, "they saw twelve sail ashore upon the Goodwin, Bunt Head, and Brake Sands, amongst whom was Admiral Beaumont in the *Mary*, the *Stirling Castle*, *Northumberland* and *Restoration*, who were all to pieces by ten o'clock, and all the men perished, except one from the *Mary* and about eighty from the *Stirling Castle*. It was a melancholy prospect to see between two and three thousand perish in this manner, without a possibility of helping them." Of the merchantmen a few had sunk at their anchors, a few more had escaped with the loss of their masts, but by far the greater part had been driven out to sea. Of these no doubt some that lay furthest north had succeeded in running out through the Gull ; most had been driven, thanks to the height of the tide, clean over the top of the Goodwins. They were small ships, as nearly all merchantmen then were, drawing only 8, 10, or perhaps at most 12 feet of water, so they went safe.

The men-of-war of the third rate drew about 18 feet, and there was no escape for them that way, and in such weather a ship which struck was a ship lost. There is little detail on record of the loss of the *Mary*, and of the seventy-gun ships, both because they drove ashore in the dark, and because in the courts-martial—which were always

held to inquire into the loss of any of the King's ships—it was not yet the custom to keep minutes of the evidence. We only know that the one survivor from the *Mary* saved his life by swimming on board the *Stirling Castle*, which must, therefore, have gone ashore close to leeward of her, and that he, doubly fortunate, was one of the eighty survivors who were taken off from the part of the wreck which remained above water on the following day. The other ships broke up completely and all were drowned. We presumably owe to the one survivor of the *Mary* the knowledge that Admiral Beaumont, a young man of thirty-four, lashed himself with two other officers to a piece of the wreck. What became of them no one knows: they were never picked up.

Even from the sheltered ports and anchorages to the westward some ships were driven to sea. There is a remarkable yarn of a tin-ship, that is, a ship laden with tin, which was blown out of the Helford River in Cornwall shortly before midnight, and was beached on the Isle of Wight next morning "between two rocks," with the loss of the ship, but without the loss of a man. The contemporary account is frankly incredible, but can, by a little care, be brought within the bounds of probability. It was stated that the wind, then at N.W., blew the ship out of the river at midnight, and that she grounded on the Isle of Wight at eight the next morning, having therefore run eighty leagues in eight hours, a speed far beyond experience.

Examination of the evidence shows that to go clear of the land the ship must have started with the wind north-westerly, and that to be driven in on the Wight she must have had it, as alleged, about W.S.W. So far so good ; but there is reason to believe that in Cornwall the shift of wind from N.W. to W.S.W. came long before midnight, which would mean that the ship was blown to sea probably about ten o'clock. And when she is credited with having grounded at eight the next morning, we are equally at liberty to suppose that for eight we may read ten. The wind in the western channel was not as furious as in the Downs, and the tin-ship was able to set a scrap of sail ; in such circumstances there can be no doubt that she drove very fast. But the distance from the Helford River to the Isle of Wight, even to St. Catherine's, is not eighty leagues (240 miles), but barely fifty leagues (150 miles). Thus from 240 miles in eight hours, a speed of thirty knots, our ship's progress is reduced to 150 miles at most in perhaps twelve hours, corresponding to a speed of about twelve knots or a little more. Even that would be a most exceptional speed in 1703, and rightly to be admired ; but it was in every way an exceptional night.

We are told also that the crew of this ship owed their safety to one youngster who had been to the Isle of Wight before, and knew of a tiny creek where he could beach her, which he did "between two rocks." This part of the story may be

dismissed. If the ship had not been out of command she would not have been beached so as to be lost ; she would either have gone on running up channel, till the gale had broken, or would have gone in through the Needles passage and put herself comfortably on the soft mud on the Key-haven side of the Solent.

The Spithead anchorage, as has been noticed, was full of ships, but few of them were lost. The shelter there is far better than in the Downs, and the fury of the storm was not quite so great. From the outer anchorage at St. Helens, south of Bembridge, the *Resolution*, of seventy guns, was blown from her anchors, and the *Newcastle*, of fifty, from Spithead. These two, driven straight before the wind, passed right over that network of dangerous shoals known as the Owers, which extend ten miles or more to seaward of Selsey Bill.

Again the height of the tide worked for salvation. Had it not been high water, or near it, they would inevitably have stuck fast on the shoals and gone to pieces, without the least prospect of a man of their crews, together amounting to some 600 or 700 men, being saved. As it was, they bumped heavily and often, but drove over into deeper water, leaky it is true, but not so leaky that they could not run in on the coast before sinking. The *Newcastle* beached herself near Selsey, unfortunately with the loss of near 200 men ; the *Resolution*, being further to seaward, was driven further to the eastward, keeping herself afloat by

hard pumping and bailing, and eventually went ashore near Pevensey, without loss of life.

A very similar story was repeated in Yarmouth Roads, whence a great many merchantmen, colliers probably for the most part, were driven to sea. One man-of-war, the *Reserve*, of fifty guns, was overwhelmed by the sea and sank, with all her crew, at her anchors. Two more were driven on outlying sands, and were also totally lost, but most rode it out in the open. The loss of the *York* on the Shipwash Sand is often credited to the Great Storm, but wrongly so. The greater part of her crew was saved, which could hardly have happened had she struck on the night of the 26th, for then probably neither man nor stick of her would have been seen again. She was, in fact, wrecked in moderate but hazy weather two days after the Great Storm.

As is well known, the families of the men of the navy who perished, from admiral downwards, were relieved out of the public funds. It is pleasant to be able to place it on record that the initiative came from the Queen, whose proposal was that they should be considered as having lost their lives in action, and their families treated by the established scale, which was, in fact, done.

As far as the Humber the storm was very severe ; we hear of many ships anchored near its mouth being blown to sea, some of which in all likelihood came to grief in the open. But there was no such exceptional loss in that quarter as to attract very

particular attention in a night of such disasters. It was reported, as striking evidence of the violence of the wind at Spurn Point that night, that it fused the bars of the grate on which the coal fire burnt which then formed the light, a thing which had never before been known to happen. But even this point was beyond the full fury of the storm, and still further north there was no wind worth recording. An ordinary gale there may have been, but a mere summer breeze to that which raged in the south.

In the port of London the fact of the tide being high when the storm was at its fiercest did not make for safety. It gave the wind a further fetch, and deprived the ships of the shelter of the banks, with the result that anchors dragged, moorings parted, and the whole mass of ships was driven to leeward in a solid body. Owing to the horseshoe bend made by the river everything between Ratcliff and Deptford was driven by the south-west wind into the bight by Limehouse, and the space being small and the number of ships very great, near 700 sail, they were driven into and on top of one another in heaps. One would be seen lying heeling from the shore with the bows of one ship over her waist and the stem of another on her forecastle ; the bowsprits of some drove into the cabin windows of others ; some lay so that the tide flowed into them before they could be righted ; some so much on top of others that the undermost sank before the other was floated. Boats every-

where were crushed to pieces between the ships, masts were carried away, and a very pretty general average was made of the external carved works in which all ships of any proper pride then indulged. Such is the picture, and there can be no doubt that in harbour, as at sea, the damage was very severe.

The first lighthouse on the Eddystone was built by Winstanley, the engineer. It was long in hand, and the design was so often altered before completion that it is not very easy to be sure whether one should say that Winstanley built two lighthouses on the rock or only one. If he built two, the first was still incomplete in 1697, when it was visited by a French ship-of-war which carried Winstanley off a prisoner and destroyed the works. He was soon exchanged, and set to work on a new edition of his lighthouse, which was finished in 1703. It was a curious structure. The base was of masonry, 24 feet in diameter and rising 20 feet above the rock, but the whole of the upper structure was of timber, and of so curious an appearance with its galleries, derricks and overhanging eaves that it has been likened to a Chinese pagoda. Men wagged their heads at it, prophesying that it would not withstand a storm; but Winstanley had complete faith in his creation, and is recorded to have said that he would wish to be in it in a gale. It so far justified his opinion that it stood through the gales of a fortnight before the fatal November 26th. Apparently it had suffered some damage, for on the 26th Winstanley, profiting by the short

lull in the weather, went off to the lighthouse with a few workmen to superintend necessary repairs. The gale which sprang up prevented his return to the shore, if indeed he wished to return, and the storm that followed gave him the opportunity he is said to have desired. How or when the lighthouse went can never be known ; all that is certain is that on the morning of the 27th no trace of the tower or of its occupants remained, everything above the solid base having been swept away by the storm.

To end with a peculiar consequence of the storm. In November an exchange of prisoners of war had been arranged with France, and at the time of the storm everything was ready for carrying it out. But when the storm had passed, the responsible office wrote to the Secretary of State saying that, though the transports were ready, they had stopped them, for the seas were full of ships disabled by the late storm of which the said prisoners might give intelligence. The Secretary of State agreed that the office had done well, adding that the cause for the delay would soon disappear, and that they were to advise him when they thought the cartels might pass. Accordingly on December 11th, a fortnight after the storm, they wrote again, saying " that as most of the ships drove out to sea by the late storm are in port by now, either here or abroad, we think our transports detained at Dover may now go for Calais with prisoners in exchange for about 300 English who

are in those parts and in great extremities ” ; and they added that H.R.H. Prince George, the Lord High Admiral, had ordered them to relieve those prisoners as soon as possible. Leave was given with only two days' delay, and the prisoners were freed from their uncomfortable quarters. The lot of prisoners of war was decidedly hard in those days.

All through the year of the storm it had been found difficult to find men for the navy, and the summer campaign had been a sickly one which had cost many hundreds of lives ; thus the loss of life in the ships wrecked came as a very severe disaster and caused the Admiralty great anxiety. The official papers of the time reflect this, and show us the authorities stretching all the known methods to the utmost in order to obtain men.

It cannot be doubted that the prisoners of war, whose return from France has been noticed, were not allowed to run free, but were carefully shepherded into the navy. That was the regular practice then and for long afterwards, for they were seamen, and the State had a right to their services. But a number of other methods existed, which were only put in force in time of great emergency, and in the weeks after the storm they are found in operation. Thus prisoners of war, especially neutrals, were promised their liberty if they would “ volunteer ” for the navy, and they volunteered. In December, 1703, four Danish seamen, taken in a French privateer, were entered

in this way, so were two French Protestant prisoners who " did not wish to return to France." It is by no means clear that they wished to enter the English navy and fight against their own country with halters round their necks ; but they did.

As a rule convicted criminals were not entered for the fighting services, though it was common enough to allow men accused of serious offences to escape trial by " volunteering " for the navy or army. In this emergency men convicted both by civil and martial courts were sent into the navy. Thus we have two seamen condemned to death for desertion, and a promising young A.B. whose life was forfeited for burglary ; on December 8th we hear of four convicts at Newgate ; and on March 8th following, a gaol delivery at Newgate resulted in a crop of thirteen men who, like those already mentioned, were " listed into the Queen's service."

It's an ill wind that blows no one any good ; and the Great Storm certainly saved a handful of rogues a hanging.

CHAPTER V

WEST INDIAN HURRICANES

It is an interesting subject for speculation how great would have been the set-back to the progress of discovery had the *Santa Maria* and her consorts been greeted by a hurricane at their first arrival in the West Indies. As is well known, nothing of the sort happened ; they ran down the north-east trades at a daily average of 100 miles, and made their landfall in the Bahamas on October 12th, 1492.

Yet there was the possibility of disaster. The old warning jingle names July, August and September as the hurricane months :—

June, too soon.
July, stand by.
August, look out you must.
September, remember.
October, all over.

But, though August and September are the months most prolific of hurricanes, yet October is by no means exempt. The greatest of all, known in history as the Great Hurricane, began to blow at the Leeward Islands on October 10th, 1780, and, moving very slowly, did not pass between the Bahamas and Bermuda till a week later. Nor did

this hurricane stand alone. It was immediately preceded by what is known as the Savannah-la-Mar hurricane, which began on October 3rd and continued for several days. Thus in 1780 there was for over a fortnight a succession of hurricane weather, from October 3rd to 18th, in a month commonly supposed to be almost free from such disturbances. There can be small doubt that had 1492 been like 1780, the fears of Columbus' seamen would have been suddenly justified ; not one of the ships would have seen Spain again, and the unknown fate of the bold intruders would have kept European seamen out of western waters for a number of years.

The Spaniards had their first experience of a hurricane at Isabella, on the north coast of San Domingo, in the season of 1495. The fury of the wind, the incessant streaming of the lightning, the darkness at mid-day, and the devastation wrought filled them with dismay. Forests were stripped bare ; mountain-side groves were tumbled down into the valleys, with vast quantities of earth and stones, thus damming the course of the streams ; dwellings were levelled to the ground ; and of seven ships in harbour three were sunk with all on board, while three more were hopelessly wrecked. Small wonder that ignorant men thought that the end of the world was at hand.

Columbus himself was ashore, and we may conjecture that he viewed the havoc with a seaman's eye, considering by what signs such a

visitation might be foretold, and how best its rage might be avoided. Seven years later, in 1502, he was able to foretell the approach of such a storm, and, though his warnings were unheeded, to save his own ships by keeping them under the lee of the land. Other ships which, scorning his advice, had pushed for the open sea, were swallowed up by the waves. And here it must be admitted that Columbus had fortune to friend. That he could recognise the signs of an approaching hurricane seems possible enough, but that, in the existing entire ignorance of the course of those storms, and of the laws which govern them, he could forecast the direction from which the wind would come is inconceivable. Had the wind come off the sea instead of off the land, or had it shifted so as to put him on a lee shore, the destruction of himself and of those with him would have been both certain and speedy. It seems probable that he himself was but on the verge of the hurricane, while the ships that perished, being further to the eastward, were nearer to its centre. But of that he could know nothing, for more than 300 years were to pass before any one attempted to determine the structure of a hurricane.

The Spaniards were not long in learning the main factors which governed the navigation of the Caribbean and of the Gulf of Mexico. The first of these was that owing to the regularity of the north-east trade wind, and of the western-going currents set up by it, it was hopeless to attempt

to sail eastward through the Caribbean Sea. The second was that the neighbourhood of the West Indies and Florida was addicted to hurricanes in the late summer, therefore journeys should be made earlier or later in the year. As the result of these considerations it was determined that the treasure fleets both from New Spain (Mexico) and the Spanish Main should return home by way of the west end of Cuba, the Havana, and the Florida Channel ; for on this course they both had the Gulf Stream in their favour, and got as quickly as possible out of the adverse influence of the north-east trade wind. It was an objection, for which there was no remedy but knowledge and care, that the passage through the Florida Channel is intricate and difficult ; and a further drawback was that, if the return home was postponed till too late in the season, there was an ugly chance that the fleet might be overtaken by a hurricane in the neighbourhood of Florida or Bermuda. This did happen occasionally, and then the losses were apt to be severe ; thus in 1589 of a fleet of fifty ships eleven were wrecked in the Florida Channel, and in 1591, the year when Lord Thomas Howard and Sir Richard Grenville went to the Azores to try to intercept it, the treasure fleet left Havana seventy-seven strong on July 17th, but lost no fewer than twenty-nine ships before sighting Flores. But even those losses did not make up the sum of its misfortunes, for before they were clear of the Azores, escorted by the

great armada which had come from Spain to meet him :—

“ A wind from the lands they had ruined awoke from sleep,
 And the water began to heave, and the weather to moan,
 And or ever that evening ended a great gale blew,
 And a wave like the wave that is raised by an earthquake
 grew,
 Till it smote on their hulls, and their sails, and their
 masts, and their flags,
 And the whole sea plunged and fell on the shot-shattered
 navy of Spain,
 And the little *Revenge* herself went down by the island
 crags
 To be lost evermore in the main,”

Every schoolboy knows how the *Revenge* came to be in that company, but probably not that the poet was literally right in describing this “ great gale ” as a “ wind from the lands they (the Spaniards) had ruined.” It was, in fact, a hurricane come from the West Indies, of which more will be said presently when the manners and customs of these hurricanes are described.

The first hurricane which came prominently into English literature was that which wrecked Sir Thomas Gates on Bermuda in 1609. Shakespeare read the story of this shipwreck, to which we are indebted for his phrase “ the still vext Bermoothes,” a phrase as accurate as it is apt. But here again, though the fact was obvious, the reason for it was not determined till the nineteenth century.

It would not be difficult to compile a fairly long list of hurricanes in the seventeenth, and more

especially in the eighteenth century, such as that of 1722 in which ninety sail of ships and sloops were wrecked at Jamaica ; that of August 29th, 1740, to which the last mentioned was but as a " common sea breeze " ; and that of 1744, in which several men-of-war were lost ; but it will be preferable, after a general description of the chief features of hurricanes, to turn to the great year 1780 for particular illustrations.

In this year there were two great hurricanes, one of which is credited with having been the severest which ever blew ; and we have detailed accounts of them both. It is perhaps curious that so great a catastrophe did not prompt some contemporary observer to examine into its nature and cause ; had any man wished it he might easily have done so, for half a century later enough detailed evidence survived to allow the history of both those storms to be traced with scientific precision. Had the possibility of learning by experience been suggested either by the events of this year, or by precisely similar disasters elsewhere, such as those which overwhelmed whole squadrons in the East Indies in 1749 and 1760, the enunciation of the " Law of Storms " might have been antedated by half a century.

Nevertheless, the West Indian hurricane has this to its credit, that it was the type of storm which first directed attention to the study of winds, and this for two reasons : the first being its extreme violence, the second its small extent, which

rendered it more easy to study than a storm or wind system extending over a whole ocean. The first suggestion of what was needed came from Colonel James Capper, of the East India Company's service, in 1801: "It would not, perhaps, be a matter of great difficulty to ascertain the position of a ship in a whirlwind, by observing the strength and changes of the wind. If the changes are sudden, and the wind violent, in all probability the ship must be near the centre or vortex of the whirlwind; whereas if the wind blows a great length of time from the same point, and the changes are gradual, it may be reasonably supposed the ship is near the extremity of it."

Colonel Capper, however, did not follow up his own suggestion, but in 1821 an American, W. C. Redfield, began publishing the results of his inquiries into the nature of the hurricanes which at irregular intervals visited the West Indies and the coasts of the southern states of America. As the result of these studies it was very shortly made evident that these hurricanes obey certain simple laws. They form a little way to the eastward of the Leeward Islands, and with few exceptions travel on a curved path which is roughly a parabola with its focus at Bermuda. A curve drawn through Guadaloupe in a north-westerly direction, passing along the Atlantic edge of the Bahamas to the Gulf of Florida, and there curving back to the north-eastward past Hatteras, and so along the coast to the banks of Newfound-

land, represents the average path of the centre of one of these storms. The hurricane travels along this path at a speed which, when compared with the velocity of the wind about the vortex of the storm, is exceedingly moderate. The rate of progress of the storm centre, and therefore of the whole storm system, may be as low as seven miles per hour, is frequently less than fifteen miles an hour, and rarely rises so high as twenty-five miles an hour. But the velocity of the wind about its centre was estimated more than a century ago to be from 100 to 120 miles an hour, an estimate which further study has confirmed. By the Beaufort scale of wind measurement the lowest wind speed which is accounted of hurricane force is seventy-seven miles an hour.

Considering the terrific power of such a storm it is fortunate that it is of small extent, and also that, now that its signs are understood, it gives good warning of its coming. When it starts on its north-westerly journey a hurricane system is rarely more than 150 miles in diameter, and is often less ; but by the time it reaches the Gulf of Florida it has probably expanded to twice its original diameter, and as it passes on to the north-eastward it continues to expand, until in the northern part of the Atlantic it may have developed into a vast storm system 2,000 or more miles across. Happily as it expands it loses its extreme violence, its force being appreciably less by the time it passes Hatteras. As a heavy gale it sometimes

makes itself felt as far as the Azores, but, though it follows the general course of the Gulf Stream, it rarely reaches as far as the British Isles, or, if it does, blows there with less violence than a severe winter gale of different origin. In these hurricanes, as in all wind systems in the Northern Hemisphere, the wind rotates about the centre in the opposite direction to that in which the hands of a clock move, thus blowing from the north on its western side, and from the south on its eastern side, and in corresponding directions throughout the circumference.

From these considerations it will readily appear why bad weather should be frequent at Bermuda ; the islands lie so close to the normal path of hurricanes that they feel the gales which extend further from the storm centre than does the wind of full hurricane force ; and occasionally a hurricane actually passes over them. It will also be seen that, with a slow-moving hurricane, it has always been possible for a sailing ship to catch up the disturbance from behind, and to keep up with it. Before the " Law of Storms " was laid down ships sometimes did this, and still more frequently sailed into a hurricane from one side or other of its path. Nowadays a fast steamer could start on the leading edge of a hurricane and run away from it, and even a slow ship, if she had sea-room, could usually get out of its track. Even in the days of sail a ship could, and sometimes did, sail close across the front of a hurricane into a position of

safety, and not know till afterwards that one had passed near her.

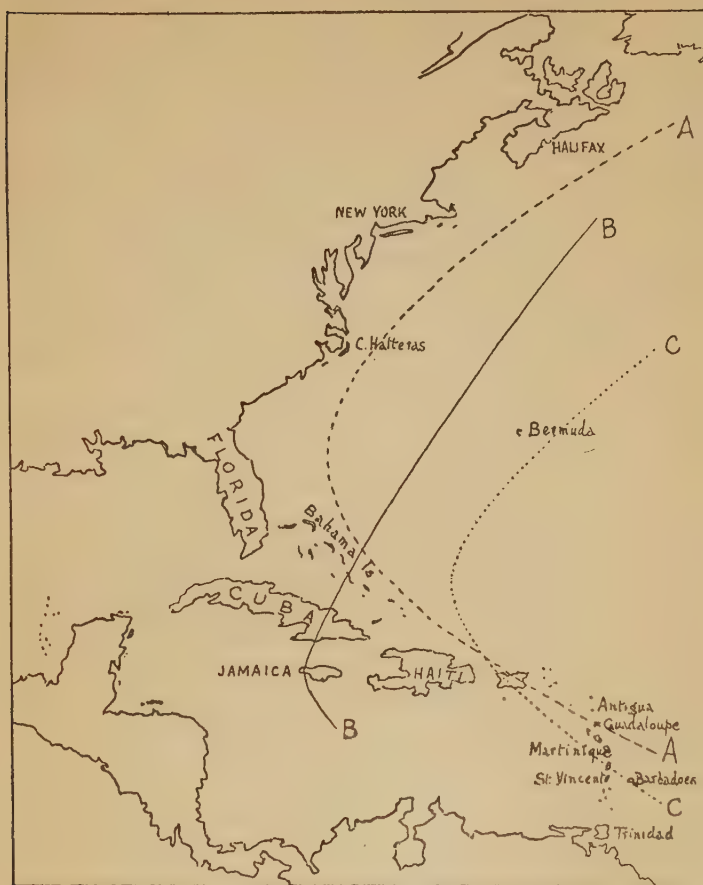
This description of West Indian hurricanes applies with slight modification to all storms of like nature, whatever their names. In the China Seas they are called typhoons, and in the Indian Ocean they are styled indifferently cyclones and hurricanes; but they all alike move on paths which have been approximately determined by experience, they obey the same "Law of Storms," and they blow as hard as those of the West Indies.

The accompanying diagram shows (A) the normal track of hurricanes; (B) the track of that which destroyed Savannah-la-Mar, Jamaica, on October 3rd, 1780; and (C) the track of the Great Hurricane of October 10th, 1780.

Both (B) and (C) were abnormal. Jamaica is ordinarily only on the fringe of hurricanes whose centres pass well to the northward, but on October 3rd the centre actually recurved over the western end of the island. The Great Hurricane had two peculiarities. Its path over the Leeward Islands was normal, but it recurved before reaching the Gulf of Florida, so that its centre passed to the eastward, instead of to the westward of Bermuda. Also it was on an unprecedented scale, its front when it passed over the islands being some 300 miles wide, or about twice the usual width, and its violence was in proportion to its extent.

Colonel Reid's success in plotting the course of the Great Hurricane was chiefly due to the fact

that it occurred during a time of war between England and France. From this it resulted that



TRACKS OF HURRICANES.

both powers had many more ships of war in the West Indies than would be found there in peace time. The log books of ships of war are preserved

among the public records, which means that invaluable records of the state of the weather, as observed on board many ships in many places on the track of the storm, are readily available. Had only merchant ships experienced the hurricane, there would have been little record save from the islands themselves, for the logs of merchant ships are not preserved in a central repository, and soon disappear. It would have been hopeless for Reid when he began his researches in 1831 to have found enough merchant ships' logs to serve his purpose.

It is true that, with the approach of the hurricane months, the naval commanders-in-chief withdrew the bulk of their forces northwards, basing them on one of the ports between New York and Halifax ; but it was always necessary in war time to leave a considerable number of ships, most of them of relatively small size, in the West Indies. This was the case in 1780. The British admiral, Sir George Rodney, with most of his line-of-battle ships, spent the hurricane months at New York, the naval forces remaining in the West Indies being commanded by a commodore at the Leeward Islands and a vice-admiral at Jamaica. Commodore Hotham, at St. Lucia, was in the centre of the track of the second hurricane, but saw nothing of the first, and, on the other hand, the storm of October 3rd fell on Sir Peter Parker's command, which was hardly touched even by the fringes of the second and greater tempest.

As is to be expected, Commodore Hotham's

official report of the Great Hurricane is couched in plain matter-of-fact language, with no attempt whatever at word painting. On the night of October 10th he wrote : “ There arose a hurricane at N.E. which increased by the morning to a degree of violence that is not to be described. The *Ajax*, *Montagu*, and *Egmont*, which had been anchored before the entrance of the harbour, were before daylight all forced to sea, as was the *Amazon* soon after ; and the *Deal Castle* and *Cameleon*, which had been stationed in Gros Islet Bay for the protection of the hospital, shared the same fate. The *Vengeance* (the flagship) with the *Etna* and *Vesuvius* bombs, and the *San Vicente* snow, were moored within the carenage, and prepared with every precaution that could be taken to withstand the tempest, which had already put several transports on shore, and by this time blew with an irresistible fury attended with an incessant flood of rain. A little after twelve o’clock the *Vengeance* parted her cable and tailed upon the rocks. It now became absolutely necessary to cut away her masts, the loss of which, with the help of a number of guns that were got forward, eased considerably the force with which she struck, and by the wind fortunately shifting 2 or 3 points farther to the eastward, her stern swung off the rocks, and she was beyond every expectation saved, for it now blew, if possible, with redoubled violence, and nothing was to be seen or expected but ruin, desolation and destruction in every part. . . .

“The storm continued with incredible violence during the whole day, but the weather about midnight became more moderate and by the next morning the wind was totally abated; the direction of it was from N.N.E. to E.S.E. and of twenty-nine hours’ duration. The incessant drift of rain which attended the hurricane almost precluded from sight any appearance of the land, but as the day broke after the storm abated an unusual and dreadful scene opened to our view.

“The face of the island, as far as the eye could reach, was totally transformed; whole forests were demolished by the roots, scarcely a house left standing, and the aspect of summer was in these few hours changed to all the gloom and dreariness of winter. But the havoc and devastation that was made through the island must be left to those upon it to describe who experienced the calamity. I shall only say that none were more pitiable witnesses of its horrors than the soldiers of the garrison except the still more unhappy wretches that suffered in the hospitals. On the 13th the *Montagu* anchored before the harbour without a mast or bowsprit standing, 8 feet of water in her hold, and all her powder damaged.”

The logs of the ships blown out to sea give a more vivid picture of distress, not because of any intention to impress the reader, but because their purpose is to account for losses suffered and to describe the measures taken to preserve the ships. Of those saved the *Amazon* frigate most narrowly

escaped sinking ; it is of interest, therefore, to be able to compare her log with a narrative written by her captain. The log states :

“ At 7 p.m. (October 11th civil time) the ship began to waterlog. At 7.30 by the violence of the hurricane the ship overset, and lay in that situation the space of 6 or 8 minutes, when the mast went by the board. Found the ship to right ; cut away the wreck, and began to heave the lee guns over. About 8 the ship quite righted with 10 feet of water in the hold ; kept the chain pumps going, and heaving the guns overboard, clearing the wreck, etc. A.m. At 2 the chain pumps chocked, with 7 feet of water in the hold ; kept the hands baling ; found several dead bodies about the deck. Everything in the hold stove to pieces and in disorder.”

Captain Finch's narrative gives a better impression of the extremity of the danger and of the exertions which it called forth :—

“ About 7 o'clock at night the gale increased to a degree that can better be conceived from the consequences than from any description I can give. There was an evident necessity of doing something to relieve the ship ; but I was unwilling to cut away the lower masts till the last extremity, and accordingly ordered the people to cut away the main topmast ; but before it could be accomplished, I found it necessary to cut away the main mast.

“ Whilst I was waiting for the men to come down

a *sudden gust* overset the ship. Most of the officers, with myself and a number of the ship's company, got upon the side of the ship: the wheel on the quarter deck was then under water. In this situation, I could perceive the ship settling bodily some feet, until the water washed up to the after part of the slides of the carronades on the weather side. Notwithstanding that the ship was so far gone, upon the masts, bowsprit, etc., going away, she righted so far as to let us heave the lee quarter-deck guns overboard, and soon after one of the forecastle guns, and to cut away the sheet anchor; which had so good an effect that we were able to get at the pumps and lee guns on the main deck. The throwing them overboard was, in our situation, a work of great difficulty; and I could perceive the ship was already going down by the stern. This arduous task was accomplished under the direction of Lieut. Pakenham, whose experience and determined perseverance marked him out as perhaps the only individual to whom (amid such great exertion) a pre-eminence could be given."

The military commander-in-chief, Lieut-Gen. Vaughan, was at Barbadoes, which, like St. Lucia, was right in the track of the storm centre, but being the most easterly of the islands felt the hurricane first.

"The evening preceding the hurricane, the 9th October," wrote Vaughan, "was remarkably calm; but the sky surprisingly red and fiery. During the

night much rain fell. On the morning of the 10th much rain and wind from the north-west."

By 4 p.m. all the ships at Barbadoes had been blown out to sea, and by six it was obvious that the storm was going to be exceptionally violent, and "at Government House every precaution was taken to guard against what might happen: the doors and windows were barricaded, but it availed little.

"By 10 p.m., the wind forced itself a passage through the house from the north-north-west; and the tempest increasing every minute, the family took to the centre of the building, imagining, from the prodigious strength of the walls, they being three feet thick, and from its circular form, it would have withstood the wind's utmost rage; however, by half past eleven they were obliged to retreat to the cellar, the wind having forced its passage into every part, and tore off most of the roof.

"From this asylum they were soon driven out; the water, being stopped in its passage, having found itself a course to the cellar, they knew not where to go. The water had rose four feet, and the ruins were falling from all quarters.

"To continue in the cellar was impossible; to return to the house equally so. The only chance left was making for the fields, which at that time appeared equally dangerous. It was, however, attempted; and the family got to the ruins of the foundation of the flagstaff, which soon after giving

way, every one endeavoured to find a retreat for himself. The Governor and the few that remained were thrown down ; and it was with great difficulty they gained the cannon, under the carriage of which they took shelter. Their situation here was deplorable ; many of the cannon were moved ; and they had reason to fear that the one under which they sat might be dismounted and crush them by its fall, or that some of the ruins which were flying about might put an end to their existence ; and, to render the scene still more doubtful, they were near the powder magazine."

Colonel Reid, who was employed on repairing the damage caused to government buildings at Barbadoes by the hurricane of 1831, diagnosed the cause of the unroofing and blowing down of houses.

Their windows before his time opened inwards, so that when once the weather windows were blown in it was impossible, owing to the force of the wind, to shut them. For the same reason the lee windows could not be opened ; thus when the wind had once forced an entrance it could only escape by following the line of least resistance. As the roofs of West Indian buildings were at that time built as in England, and not tied down to the wall plates as Reid afterwards advised, it resulted that the imprisoned wind made its escape by lifting off the roof.

"What few public buildings there were," Vaughan continued, "are fallen in the wreck : the fortifications have suffered considerably. The

buildings were all demolished ; for so violent was the storm here, when assisted by the sea, that a 12-pounder gun was carried from the south to the north battery, a distance of 140 yards."

Reid's comment on this statement is that the gun was on its carriage, which had wheels. A good deal of exaggeration grew up concerning the fate of the guns at Needham's Point, for clearly a hurricane such as this afforded a fine opportunity to the spinners of tough yarns. Marryat gives a sample of what they made of it :—

" ' Tell me, Swinburne,' said Peter to the old quartermaster, ' were you ever in a hurricane ? ' "

" ' I've been in everything, Mr. Simple, I believe, except at school, and I never had no time to go there. Do you see that battery at Needham Point ? Well in the hurricane of '82, them same guns were whirled away by the wind, right over to this point here on the opposite side, the sentries in their sentry boxes after them. Some of the soldiers who faced the wind had their teeth blown down their throats like broken 'baccy pipes, others had their heads turned round like dog-vanes, 'cause they waited for orders to the " right-about-face " ; and the whole air was full of young niggers blowing about like peelings of ingins.' "

" ' You don't suppose I believe all this, Swinburne ? ' "

" ' That's as may be, Mr. Simple, but I've told the story so often that I believe it myself.' "

It will be noticed that Marryat places the hurri-

cane in the wrong year, possibly by confusion with that which wrecked Rodney's prizes in 1782.

Sir George Rodney returned to the West Indies on December 5th, and reported on the damage caused to his command by the hurricane.

"It is impossible," he wrote, "to describe the dreadful scene it has occasioned at Barbadoes, and the condition of the miserable inhabitants. Nothing but ocular demonstration could have convinced me that it was possible for the wind to cause so total a destruction of an island remarkable for its numerous and well-built habitations; and I am convinced that the violence of the wind must have prevented the inhabitants from feeling the earthquake, which certainly attended the storm. Nothing but an earthquake could have occasioned the foundations of the strongest buildings to be rent: and so total has been the devastation, that there is not one church, nor one house, as I am well informed, but what has been destroyed."

He wrote also to his wife, with less reserve:

"The strongest buildings and the whole of the houses, most of which were stone, and remarkable for their solidity, gave way to the fury of the wind, and were torn up to their foundation: all the forts destroyed, and many of the heavy cannon carried upwards of a hundred feet from their forts. Had I not been an eye-witness, nothing could have induced me to have believed it."

In these accounts of the storm Rodney reflects public opinion. He repeats the common belief

that an earthquake accompanied the hurricane, which was not the case ; and he shows the legend of the guns well started on its snowball career. It should be mentioned that the belief that an earthquake took place during the continuance of a hurricane is frequently met with, but always seemingly without cause. The reason for the belief may lie partly in the fact that the premonitory symptoms of an earthquake and of a hurricane are very similar, as will be familiar to readers of Michael Scott's West Indian stories : men's minds were thus predisposed to look for an earthquake, and when they saw the stupendous damage caused by the hurricane they had no difficulty in concluding that the wind alone could not have wrought such havoc.

Dr. Blane, who was with Rodney, also wrote a picturesque account of the hurricane, which, like Rodney's, was inaccurate in some particulars, and for the same reason, that he had to depend on hearsay and on after-effects.

" All the fruits of the earth, then standing," he wrote, " have been destroyed ; most of the trees of the island have been torn up by the roots ; and (what will give as strong an idea of the force of the wind as anything) many of them were stripped of their bark. The sea rose as high as to destroy the fort, carrying the great guns many yards from the platform, and demolishing the houses near the beach."

If the description of this hurricane is compared

with that of the Great Storm of 1703, it will be recognised that the latter blew with true hurricane force. We find the same devastation, the same electrical condition of the atmosphere, and the same suspicion of an earthquake in either case. We also find in England in 1703 the countryside saturated with sea-spray for many miles from the coast, a phenomenon which has been observed and commented on in many West Indian hurricanes.

CHAPTER VI

THE LAST VOYAGE OF THE *Elizabeth*, 1764

It must be placed to the credit of His Majesty's Ship *Elizabeth* that she was an old ship. She was launched in 1737, during the period of the "establishments" for naval shipbuilding (that is, when ships were built in each class to a sealed pattern), and she served all through two wars, that which began with the trouble about Jenkins's ear in 1739, and the Seven Years War. Moreover, throughout the second of these wars her service was in India; and ships, like men, find a long continuance of a tropical climate very exhausting. Including her voyages out and home she was in India for eight years, a length of time not without its significance, for the East India Company at that date limited the life of its ships to four voyages of two years each. When they began their eight years of active service the company's ships were new, but when the *Elizabeth* went to the East Indies she was already an old ship and, by the company's standard, ought to have been cast for age.

Even this account leaves out of reckoning the many sea fights in which the *Elizabeth* took part, and the strain imposed on the ship by the heavy armament she had to carry. East Indiamen

carried few guns and light in proportion to their size, and did not use them if they could help it, for fighting was not their business.

William Nichelson, the master of the *Elizabeth* during this long commission, wrote a narrative of it, and elsewhere gave an account of her return voyage to England. He was a man to whose hand a quadrant or a marline spike came more readily than a pen; but there is a transparent sincerity about him which, in spite of, or perhaps because of, his crabbed sentences and limited vocabulary, makes us feel that we know the man himself. We can hear his sigh when he bids farewell to his ship, and can sigh with him for sympathy:—

“Thus ended a good old ship, that had done great service, and for which I had great veneration, though I had so much trouble in her.”

Peace was signed in Europe in February, 1763, but owing to the slowness of communications the war did not end in the East Indies till six months later. The line-of-battle ships, being no longer needed on the station, were ordered to be sent to England, and the *Elizabeth*, in deference to her condition of senile decay, was prepared for her long journey by taking out all of her lower deck guns, and also most of the lighter guns above, leaving only eight a side mounted on the upper deck.

Sailing from Bombay on December 16th, the *Elizabeth* joined Admiral Cornish in the *Norfolk*, with the *America* and *Chatham* in company, off

Calicut. Thence they sailed through the Nine Degree Channel, and until January 31st, 1764, made a prosperous voyage with pleasant weather and fair winds.

“ The 31st January,” wrote Nicholson, “ being in latitude $20^{\circ} 46'$ S., longitude made from Mosambique $2^{\circ} 11'$ W., it bearing N. 20° E., distance 122 leagues, in company with the ships as before mentioned, from noon to midnight hard fresh gales from N. by E., round by the E.S.E., with rain and thick hazy weather, and a large sea from the N.N.E., and also a large sea from the S.E., which thwarted the N.E. sea and made it run very high, so as to occasion the ship to labour very much, and, straining her, made her make much water.”

The computation of the longitude from the meridian of Mozambique will serve to remind the reader that until the advent of the chronometer and of the Nautical Almanac, neither of which was available till shortly after the date of this voyage, a ship at sea could only determine her position accurately by making the land and taking a new departure. So the *Elizabeth* sighted Mozambique. It mattered little for the immediate purpose of sailing through the Mozambique Channel, between Madagascar and the African coast, that the longitude of Mozambique was unknown; for a knowledge of the ship's position relatively to that fixed point was enough to enable her navigator to proceed with tolerable safety. Thus during the

severe storm of the days which followed (" although the sailor in the Mozambique Channel generally escapes the cyclones of the Southern Indian Ocean, yet he must be prepared for hard gales and severe squalls," say the Sailing Directions), although unprepared to find, as he did find, that a strong current was setting the ship to the southward, the *Elizabeth's* navigator was able to keep her well clear of the land. The southern part of the channel is some 500 miles broad, and the ship during her severe trial by wind and sea did not approach within 100 miles of either shore.

To get back to Nicholson's narrative :

" At one a.m. came on a hard gale of wind at S.E., with much rain, squalls, and thick hazy weather ; one of the main topsail sheets gave way, which occasioned the sail to split, and it blew all away from the yard " ; after which the crew was kept very busy furling sails and sending down the upper masts and yards, until the ship was laid to " under a reefed and ballanced mizen, and mizen stay-sail."

It is worth noticing that at this date, and for a considerable time afterwards, it was still the most usual course to lay a ship to under her mainsail in a storm, a practice which caused the loss of many ships. In the great storm of 1782, for instance, which destroyed the prizes taken by Rodney on April 12th, many of the ships which perished were lost from this cause ; and it seems probable enough, to judge by the sequel, that had the

Elizabeth had her mainsail set she would not have been heard of again.

All that day the same violent south-easterly gale continued, with a great sea, and "the ship strained and opened much in her upper works, and made so much water that she gained upon us with all the chain-pumps constantly going, and baling at the fore-hatchway with buckets. . . . All the brick work of the coppers and grates fell down; got in the jib boom and spritsail yard, lowered down the main yard, and hove four of our guns overboard to ease the ship. . . . At midnight, found the water gained on the pumps, the ship having six feet eight inches of water in the hold, and the water still gaining. It was by a consultation of the captain and officers, as our last shift (the ship rolling and labouring so much when lying to, and making so much water as to gain one foot in half an hour, which greatly dismayed the ship's company), agreed to wear the ship, and scud under the goose-wing of the foresail on the other tack, in order to bring the starboard side, which had been the lee side, as much out of the water as possible." They accordingly set a goose-wing, that is, one corner of the foresail, and ran to the northward. Finding that they could keep the water from gaining any more, and not wishing to run back on their course further than could be helped, they hauled to the wind at 6 a.m. with the ship's head to the eastward. "At noon this day very strong gales of wind, with a very high lofty

hollow sea," the ship straining and leaking so that by pumping and baling continuously they could do no more than prevent the water in her from increasing.

On February 2nd it was still the same weather, and "the ship still strained and opened in her upper works as before mentioned. . . . Struck the main topmast in order to ease the ship's upper works. At 9 p.m. (remember that the sea day began at noon) the ship rolled and laboured very much, the tiller broke in the rudder head, we shipped another tiller immediately." Then, for fear of getting too near the coast of Madagascar, they wore round and stood to the westward, and spent the rest of the day getting everything above the lower masts, except the fore topmast and its yard, down on deck to ease the ship. On this day they sighted the *America*, one of the ships which had sailed from India with them, and during the following days were able to keep company with her. This must have helped to put heart into the crew of the *Elizabeth*, who, though Nicholson does not mention it, must have been exceedingly jaded by this time. Incessant violent rolling by itself alone fags men out; but to this must be added that they were always wet, that they got little or no sleep, but were kept constantly at the severest labour, and that since the beginning of the gale they had been eating their meat raw, for, as we have seen, the whole of the cooking arrangements of the ship had been destroyed.

But worse was to come, though the gale was approaching its end. On February 3rd they had the same "very fresh gales of wind, and thick cloudy uncertain weather, with heavy squalls and rain, and a great sea from the S.S.E." This afternoon the tiller broke again, and when they set about replacing it they found that the rudder was loose. To lose their steering gear was bad enough ; but on examination they found that the rudder was freeing itself from the ship by tearing away the irons which fastened it to the stern. As each of these tore out it caused new leaks, and they already had quite as many leaks as they could deal with. The upper irons had already gone ; and if the rudder was allowed to tear the rest away deep below the water line, there could be no doubt but that the ship would sink very shortly. There was, therefore, nothing to be done but to unhinge the rudder and let it go before it caused more harm, and this they succeeded in doing. In the old men-of-war the breadroom was in the stern and low down under the waterline, which meant that these new leaks, caused by the rudder, had the additional disadvantage of soaking a great part of their biscuit in salt water.

It was at this stage of the proceedings that the *Elizabeth* made a signal of distress, which caused the *America* to stand down close to her. This, however, was but a precaution against the future, for no boat could have passed, and they still had to rely on their own efforts.

By the next morning the gale seems to have been past its worst, for we hear that the leaks could be kept under with two of the four chain-pumps, thus setting more people free for other very necessary labour. To begin with, they had to ease the ship still further by getting down the fore topmast, the only one still remaining aloft, and, in order to keep her under control, they had to send up jury topmasts, light spars, in place of the heavy masts which they had stowed on deck. Then they had to make a jury-rudder, or as they called it, "a machine for steering the ship"; and, above all, they had to take measures to prevent the ship from falling to pieces like a house of cards. Here is Nichelson's picture of the condition of the ship :—

"The people employed making a machine to steer the ship by instead of a rudder, and in frapping the ship in several places, in order to succour the ship's sides and upper works, and to prevent their working and opening in the manner they did; got up the mizen top-mast for a jury main top-mast, this we did to ease the ship's upper works, and proceeded in the frapping to keep the ship together, for during the gale of wind it strained and opened in a surprising manner; found many of the chain-bolts started two or three inches, and a great many of the tree-nails in the ship's bows and upper works, some of them worked one, two, or three inches inwards, and others worked as much without the ship's side; all the bolts of the wales

and upper works and of the deck worked in a surprising manner, several of them by the working of the ship rose the whole thickness of the plank above the deck, and sunk down again with the motion of the ship, some drew the nails up with them, and some drew the heads of the nails through them, which made it very dangerous to walk or stand upon deck. In wet weather the people could not lie in their hammocks, and the toes of the standards (vertical knees) with the ship's rolling would lift off from the deck, some of them four, five, or six inches, and the gunwale, and the streak below the gunwale, was quite broke off at the gangway port, quite down to the upper deck. In short, the ship was an entire wreck."

It is hardly necessary to be familiar with the various technical terms employed in order to understand that the ship was in a very bad way. She had drawn most of her fastenings, so that she could only be kept together by "frapping" her, which means by binding ropes round and round the hull and straining them as tight as possible. This was no new thing: "We used helps," said St. Paul, "undergirding the ship"; nor was it particularly uncommon, for in the gale of 1782, to which reference has already been made, several of the ships which sank had been frapped together by their crews in a desperate attempt to keep them afloat. Admiral Graves's flagship, the *Ramillies*, was one such: she was frapped for the greater

part of her length, and thereby just, but only just, succeeded in keeping afloat until a short lull in the gale allowed the admiral and crew to save themselves on board the other ships in company. But other ships, less fortunate, or perhaps less well commanded, went down with all hands.

Nevertheless, in spite of the frappings, the *Elizabeth* was in grave danger. They could only keep her sides from falling out and did little or nothing to prevent her from breaking in two across the middle, as, from the break which showed itself at the gangway, she clearly had the intention of doing. Nothing but a cessation of the foul weather could save her from that end, and fortunately on February 4th the gale broke. By comparison with what had passed the weather became moderate, and though Nicholson logged "fresh gales and a great sea from the southward," he added "the weather is much abated," and, on the following morning, "the sea smoother than yesterday." But it continued to blow fresh with a great swell for two more days, and it was not till the 7th that he was able to log the return of moderate weather.

All these days they continued hard at work, pumping, getting up jury top-masts and making what sail they could, frapping the ship together, "and making a machine to steer the ship by."

On February 8th the machine was completed, got overboard, "and hung to the ship's stern in the proper place. This machine was to supply the

place of the rudder. At half-past six made sail and wore ship to the westward with the machine, which seemed to answer very well." Thus equipped they steered for the Cape of Good Hope. "We were thirty-nine days from the time we met with the storm, in which time we navigated the ship upwards of 650 leagues to the Cape of Good Hope, where we arrived the 9th March, 1764, after experiencing much trouble, fatigue, anxiety, and almost every painful sensation that could be presented to the human mind for thirty-nine days together; but when we arrived at the Cape of Good Hope, we were relieved from our trouble and care, for which we were thankful to God for his gracious goodness in preserving us in such imminent danger as we had been in, and sending us safe into port after all our troubles."

It might have been supposed that once in port the ship would not go out again; but that was not the way of the navy. If it was humanly possible to bring your ship home again you must do so, and in the circumstances it is not remarkable that men stretched a point or two in deciding what was possible. But still one is permitted to wonder what would have been said, even in the eighteenth century, had the *Elizabeth* gone to the bottom with her crew after leaving the Cape. Many crazy ships both then and after foundered on passage—notably the *Blenheim* with Sir Thomas Troubridge not very far from where the *Elizabeth* met her gale—but none of them, it is believed, ever started

on a long journey in so bad a condition as the *Elizabeth* was in when she sailed from the Cape. Had she met with another gale she would either have broken in two, or, in spite of the frappings, the ends of her beams would have worked away from the shelves on which they rested, so that the decks would have fallen down into the hold, pushing out the ship's sides as they went. This was what sank the *Ramillies* and the *Centaur* in 1782, and doubtless other old ships of which we only know that they did not return.

"We lay at the Cape of Good Hope," says Nicholson, "from the 9th March to the 17th April, 1764. During this time we were employed in refitting our ship in the best manner we could. We got two hand pumps fixed down the fore hatchway, to pump the water out of the fore hold, the ship being so much shattered or clogged that the water could not run aft to the pump well. So much shattered was the ship, that a man standing at the after part of the wardroom, and another man standing under the fore-castle (*i.e.*, at the two ends of the ship, about 150 feet apart) could not see any part of each other below the middle; and the ship was quite broke off and parted at the gangway from the gunwale down to the upper deck."

This distortion of a ship in the direction of her length was what is known as hogging, and meant that her keel had given way so that it stood higher in the middle than at the ends. A foot or two of hogging was by no means uncommon in old ships,

but from the illustration which Nichelson gives it appears that the *Elizabeth* was hogged by the enormous amount of 4 feet at least.

“ We caulked in all our lower deck-ports,” he continues, “ by way of strengthening the ship, and afterwards covered the ship’s sides and decks with canvas, to prevent the water from coming in, that the people might lie dry in their hammocks, and paid the canvas all over with pitch. We got out all our iron ballast, to ease the ship, and put it on board the other ships of the squadron. We made a new rudder. . . . The ship being fitted in the best manner we could, and taking particular care that the frappings which we had on the ship when we went into the Cape were the same when we sailed from it, and were hove well tight, we prepared for sailing, taking care to preserve our machine, that should our new rudder not answer in steering the ship, we might again have recourse to the contrivance to supply it. We sailed with the Admiral and the squadron from the Cape 17th April, 1764, and found our new rudder answer very well. . . . We arrived at St. Helena the 30th April. While we lay at this place we got our sheet and spare anchor down the main hatchway into the hold ; and when we sailed from thence we got the bower anchors aft . . . in order to ease the ship’s bows.

“ We sailed from St. Helena the 6th May, and had a pleasant passage, with pretty good weather. Between St. Helena and England our ship proved

tighter than we expected ; in fair weather she only required pumping once an hour, and sometimes every half-hour. With a fresh breeze of wind and sea she kept one chain pump and two hand pumps that were placed down the fore hatchway constantly going ; and when it blew strong, with a large sea, the ship required two chain pumps and two hand pumps to keep her free ; and whenever it blew fresh we were very cautious in carrying sail, being obliged to take the reefs in the top-sails when any other ships might have carried their top-gallant sails. . . .

“ The ship strained or worked in such a manner it was frightful to behold. In going against a head sea, I have often thought she would have parted in the middle ; but it pleased God she held together, which was as much as we could say, for nothing but the frappings could have kept her together. We sailed from St. Helena the 6th day of May, and arrived at Spithead the 11th of July 1764. We were nine weeks and three days on our passage.

“ We were ordered to Chatham to be paid off. It was judged necessary to have something done to the ship by way of preparing her to proceed to Chatham, by securing her upper works, to keep her together, before she could go from Spithead.

“ In consequence of this application, a number of shipwrights and caulkers from the dockyard were ordered on board, to do what might be necessary for the ship's going round to Chatham.

When the artificers came on board, they were surprised beyond expression to see the ship frapped fore and aft upon both decks, the decks and sides all covered over with canvas, and the ship so much broke or hogged it was frightful to behold ; and we thought it unsafe to take off any of the frappings. The shipwrights and caulkers were so much surprised at the appearance and condition of the ship, that they did not stay on board a quarter of an hour ; they thought themselves in danger in being on board the ship as she lay at Spithead ; they went ashore and reported the ship to be in such a condition that it was impossible to do anything to her, and that it was unsafe for the ship even to lie at Spithead. When this report was sent to the Admiralty, the ship was ordered into Portsmouth harbour, where we were paid off, and soon after the ship was ordered to be taken to pieces. She did not require much trouble to break her up."

CHAPTER VII

AFTER TRAFALGAR

“ PARTIAL firing continued until 4.30, when a victory having been reported to the Right Honourable Lord Viscount Nelson, K.B. and Commander-in-Chief, he then died of his wound.” Thus the *Victory’s* log. The fighting was over ; what was left of the combined fleets of France and Spain was in full flight ; it remained for the victors to patch up their battered ships, and to secure their still more battered prizes, preparatory to a return to port.

But—and the “ butts ” were neither few nor unimportant—several of the British fleet, and all of the prizes, were so much disabled that it would be impossible for them to make even the short passage to Gibraltar unaided ; the enemy’s headquarters, Cadiz, to which most of the fugitive ships had escaped, was very close to leeward, and it was known that a strong reinforcement of Spanish ships awaited them there ; it was close on night-fall ; an on-shore gale of wind had been brewing all day, and might come on at any moment ; and the master mind had been taken away. Few admirals have been confronted with a more awkward problem, or rather set of problems, than

that which greeted Collingwood when he succeeded to the command on the evening of October 21st.

Every one will remember that one of the last signals which Nelson made when going into action on October 21st was that his ships were to be prepared to anchor at the close of the day. He foresaw that his own ships, and the prizes which he confidently expected to have by then, would be very severely damaged in the coming battle. The wind, though light for the time being, was on-shore, and the swell which was running foretold a coming gale. The importance of this order dwelt in Nelson's mind as he lay dying ; and when Hardy visited him in the *Victory's* cockpit, he repeated it to him. Hardy suggested that Collingwood would take the decision as to anchoring upon himself. " Never while I live," exclaimed Nelson. " Do *you* anchor."

But Nelson did not live, and as soon as the firing ceased Hardy went on board the *Royal Sovereign* to inform Collingwood of his death and his last wishes. " Anchor ? " said Collingwood, " That is the last thing I would have thought of " ; and, in fact, he did not anchor. In the event not one of the English ships, no matter how severely damaged, came to grief ; but of the eighteen prizes only four reached Gibraltar. It has frequently been assumed that this wholesale loss of the trophies of war was in great part due to Collingwood's decision not to anchor ; but that decision has never been critically examined.

It has been suggested that Collingwood's reason for not thinking it advisable to attempt to anchor was that he knew that the ships would be in no condition to do so—that their anchors would have been broken and their cables cut by shot. But this is absurd. Each ship regularly carried three large anchors ready for letting go, and an anchor is a thing not easily damaged. Probably not more than one in a hundred anchors is damaged beyond use even in a great fleet action ; and the logs show that the anchors of the fleet suffered no exceptional damage at Trafalgar. On the other hand, the cables are more vulnerable ; but then they are easily repaired. If they are shot away, the part damaged is that which is near the anchor ; and all that is necessary is to cut the wounded part off, and bend the cable again, it being thus slightly shortened. This happened to a few ships in the battle, and was a very small thing. There was indeed nothing to prevent the ships from anchoring when ordered to do so ; and in the course of the next few days a great many of them were ordered to anchor, and did anchor. What is more, at nine on the night of the 21st, Collingwood made the signal for the fleet to prepare to anchor ; but he did not go beyond the preparative, and the anchors were not let go. What is the explanation of these seeming contradictions ?

To begin with the position of the fleets when the battle was joined. The Spanish coast from Cadiz to Cape Trafalgar runs S.E. by S. and N.W. by N.

true, the distance between those two points being twenty-five sea miles. The *Victory* broke through the enemy's line at a point twenty miles due west of Cape Trafalgar, and twenty-two miles S.S.W. of Cadiz. The wind during the battle and for the rest of the evening was W.S.W. very light, accompanied by a great swell ; but this direction was as observed on board the ships, *i.e.*, by compass, which, allowing for the variation of the compass, means that the wind and swell were south-westerly. They were therefore dead on shore, so that disabled ships, especially with the swell taken into account, could not be expected to weather Cape Trafalgar with its outlying shoals.

Also the position of the ships at the end of the battle was even more unfavourable than it had been at its beginning. The whole course of the fight was in-shore, the ships, almost without motion through the water, driving slowly towards the land before the swell ; and this was especially the case with the many dismasted ships. The prizes were all disabled, most of them entirely so, and the only way to save them, as it seemed to Collingwood, was to send his own least damaged ships to tow them. This was done ; but the process involved bringing the ships, with few exceptions, still nearer to the land, and certainly into a position from which they could not get round Cape Trafalgar with the wind that was blowing.

One ship, and seemingly one only, got round the

cape that night. This was the English seventy-four *Belleisle*, which, partly dismasted in the battle, had immediately been taken in tow by the frigate *Naiad*. Standing as much as possible to the southward, they scraped round the cape with very little to spare ; and, but for the accident of the tow rope parting in the gale of the following day, might well have reached Gibraltar, forty miles from Trafalgar, on the evening of the 22nd. As it was, after being in serious danger from the shore to the eastward of the cape, and therefore out of sight of the whole fleet which remained to the westward of it, she was again taken in tow, and anchored at Gibraltar on the 24th. No other ship got in until long afterwards.

As long as the wind blew dead on shore it did not matter much which tack the ships stood on : either would be certain to bring them into shoal water in a few hours, and then, if the wind did not shift, there would be nothing for it but to anchor. Possibly the reason which decided Collingwood to stand to the eastward on the starboard tack, that is, with the wind on his right-hand side, was that this was the course which took him away from Cadiz. If he had stood on the other tack, towards the north-west, by the time anchoring became necessary the ships would have been very close to Cadiz, and therefore in some danger from the enemy. It was not as if the enemy had in that port only the dismantled ships which escaped from the battle ; they had there several others, believed

to be ready for sea, but for which it had been impossible to find men. There would, however, be no great difficulty in manning them with the crews of the fugitive ships. This was a risk to be taken into account.

Further, it is likely that Collingwood considered that when the wind starts backing it is likely to back more. It had backed about a couple of points, from slightly to the northward of west to W.S.W., during the afternoon of the 21st. If it was going to draw still more southerly, it would be as well to be as far to the southward as possible ; for then by going about the fleet would have a fair wind off-shore. If, however, the wind remained constant in direction, or drew back to the west, it would always be possible to anchor.

What happened was this : The leading ships of the fleet, among them the frigate *Euryalus*, to which Collingwood's flag had been shifted at the end of the battle, were by nine o'clock on the night of the 21st approaching Cape Trafalgar. The wind remained light and from the same direction, and the *Euryalus* sounded in twenty-three fathoms. Collingwood immediately made the general signal to prepare to anchor ; but as the water deepened again after a few casts, he decided to stand on a little further. After being in as little as fourteen fathoms, and having deepened to as much as thirty-six, he was at midnight again in twenty-two fathoms. The *Euryalus* herself had in fact got round the cape ; but many of the fleet, including

all the most disabled ships, were further inshore, and therefore could not weather it.

At this apparently critical juncture the wind suddenly backed four points to the S.S.W. The effect of this change was that the ships could now wear, that is, turn round with their heads to the westward, and stand off-shore ; and this Collingwood immediately ordered them to do. The wind had freshened somewhat, and in the early hours of the morning the fleet made good way. By eight o'clock the *Euryalus* had towed the *Royal Sovereign*, Collingwood's disabled flagship, far enough off shore to justify the transfer of the duty of towing her to another ship. The *Neptune* was therefore ordered to tow her, and the *Euryalus* went free to supervise the movements of the fleet.

It was as well, for almost immediately the gale began which blew with little intermission for four days. Had it blown without lulls, and always from the same point, there can be small doubt that most, if not all, of the ships with Collingwood would have been wrecked. But fortunately it paused every now and then, to take breath as it were, and its direction varied between west and south. Thus it happened that most of the English ships were able to keep away from the shore.

The prizes, however, were less fortunate. This was partly because they were in an even worse condition than the English ships ; but chiefly because they had very few men to handle them.

The " prize crew " put on board a surrendered

ship by the victors numbered only about fifty officers and men. As long as the weather was moderate, and especially if the prize was in tow, this number could manage fairly well ; but in a gale of wind such a number could do little with a line-of-battle ship, even if in good condition. When, therefore, the gales broke the prizes adrift from the ships towing them, the prize crews were nearly helpless. They had four duties to perform, and hardly enough men for any one of them. They had to pump the ships or they would sink, being riddled with shot ; they had to clear up the wreck and refit the masts and sails ; they had to sail the ship ; and they had to guard the prisoners, who were in many cases ten times as numerous as themselves. It is, therefore, small wonder that the prizes were driven inshore, and anchored as best they could, but all of them dangerously near the coast. To take them in tow again when they had broken loose in a gale of wind was a work of very great difficulty, but it was heroically attempted, often with success. Many ships in tow, both prizes and our own disabled ships, broke loose two and three and even four times, and were almost as often picked up again ; but every time, until again taken in tow, they were driving to leeward into a more and more dangerous position.

It is natural that the enemy should have recognised the difficulties with which the English had to cope, and should have prepared themselves to draw from them what advantage they might.

They were, of course, perfectly familiar with the habits of the winds on their own coast. Indeed the consideration of these winds bulks largely in the campaign of Trafalgar, for when, at the beginning of October, Villeneuve attempted to sail from Cadiz with the combined fleet, the Spaniards opposed his purpose. They spoke of the autumn gales which were in immediate prospect. Far better, they said, to wait till the first outfly of those winds was past, and then set about the expedition on which they were bound. The English fleet was watching for them outside : it was too strong for them ; but if it remained there watching and was caught by the gales it would be scattered at best, perhaps disabled. Then would come their opportunity. But Villeneuve, with the fear of Napoleon ever before his eyes, could not and dared not wait. He must sail with the first slatch of wind which would allow him to get out of port ; and that is what he did.

Let us turn now to the fortunes of individual ships in the gales, and especially of the prizes.

The moderate S.S.W. wind, which allowed the fleet to draw away from the dangers of Cape Trafalgar in the early hours of the 22nd, did not last for long. Soon after eight o'clock it freshened quickly to gale force, shifting somewhat towards the south-west. The effect of this was to make the course of the less weatherly ships, those most disabled, and those in tow, roughly parallel to the shore, so that instead of gaining a good offing they

found themselves pinned within a short distance of Cadiz. Many of them passed Cadiz and are heard of as having been during the next few days to the north-west of it.

The *Victory* herself managed very well, and succeeded in increasing her distance from the shore. She was, by comparison, not very badly disabled, for though she had lost her mizzen mast, her other masts stood, and she was still manageable under her own power. On the 24th she had got into open water, having no bottom with 100 fathoms, and then the *Polyphemus* took her in tow. In the gale of the 25th she parted from the *Polyphemus*, and the next day was picked up by the *Neptune*, which, in spite of the chapter of accidents, was able to weather Cape Trafalgar with her on the 28th, and to anchor at Gibraltar on the evening of that day. She had as uneventful a time as any of the ships left to the westward of the cape, having only the gales and her own damages to contend with. The woes of the prizes, the dangers of the lee-shore, the threat of the enemy's coming out of port, did not affect her.

The *Royal Sovereign* had suffered more damage to her spars in the battle, and therefore had proportionately greater difficulties during the gales. Collingwood shifted his flag to the frigate *Euryalus* as soon as the battle was at an end, for the flagship, being nearly completely dismasted, could not make his signals. The *Euryalus* had taken her in tow as early as 3 p.m. on the 21st, a daring service which

had brought the frigate herself under fire. In tow first of the *Neptune* and then of the *Mars* she crabbed painfully along, hardly increasing her distance from the shore, but doing her best to get up jury masts. Then came the gale of the 25th, the heaviest of the series. In it she rolled away her foremast, the only one of her original masts which remained after the battle, rolled one of her poop carronades overboard, and had to heave over four of her boats. On the 26th, when the weather began to improve, she was off Chipiona, only about ten miles from the land, but some twenty miles north-west of Cadiz. In other words, she was closer inshore, and further from Gibraltar, than she was on the afternoon of the 21st. Fortunately, however, the weather became more moderate, and she was able to reach Gibraltar on November 2nd, having taken twelve days to make a passage of about sixty miles. When in good trim and with a fair wind she could have sailed the distance in six hours.

The *Temeraire* was in even greater danger than the *Royal Sovereign*, for in addition to her former damages, she lost her rudder in the gale of the 25th. She had by then been driven up the coast in a north-westerly direction to a point forty miles beyond Cadiz, and there she lay windbound at anchor for four days, from the 26th to the 30th, doing what she could to repair damages. Then the wind changed, and the *Defiance*, which had her in charge, towed her sixty miles straight out to

sea, preferring a good offing to the chance of being caught again on a lee shore. From that point she was able to reach Gibraltar on November 2nd, the same day as the *Royal Sovereign*, and without more incident than a collision with the ship which had her in tow.

A collision between two large ships in bad weather was always a serious thing, and usually resulted in more or less heavy damage ; but it was as much part and parcel of the business of towing as was the breaking of a tow rope. While the tow rope held, a collision might be caused by a shift of wind, or by a sudden calm ; and if the hawser broke, there was always an ugly chance that the ships might come into collision during the effort to pass a new rope to the disabled ship. Indeed this latter risk was so great that in many cases, when the tow rope broke in the dark, it was found best to wait till daylight before attempting to pass another. This no doubt economised in collisions, but it allowed the dismasted ships many hours of uninterrupted drift, and was one of the reasons why the prizes drove so close in shore.

“ We have been in constant apprehension of our lives,” wrote Captain Harvey, of the *Temeraire*, to his wife ; and, he added, the experience has been “ *shocking* for our poor wounded.” With little variation all the English ships were in similar case ; yet their sufferings were small enough when compared with those which the unfortunate Frenchmen and Spaniards in the captured ships endured.

Of the prizes the *Fougueux*, a French seventy-four-gun ship, was the first to perish. Her station in the battle had been at that part of the line where the *Royal Sovereign* broke through, and she had been terribly mauled : her captain and most of her officers were killed, and half the ship's company was killed or wounded. All her masts were shot away, and her hull was so shattered that she was leaking like a sieve. An English frigate picked her up at the end of the battle and towed her off, but during the night she broke adrift. At dawn an attempt was made to take her in tow again, but the increase of the gale prevented it. She was already very close in shore, and during that morning, the 22nd, she drove ashore some ten miles north-west of the cape. The ship quickly went to pieces, and drowned almost every person on board, including the prize crew which had been put on board her by the English *Temeraire*. One of the French survivors wrote his experiences :

“ The water had risen almost to the orlop deck. Everywhere one heard the cries of the wounded and the dying, as well as the noise and shouts of insubordinate men who refused to man the pumps and only thought of themselves. The scenes of horror on board the ship that night were really the most awful and fearful that imagination can call up.”

The mention of insubordination on the part of the prisoners introduces an important question. Given the ship in danger, and left to shift for her-



AFTER TRAFALGAR: THE SINKING OF THE "REDOUTABLE."

(From the Painting by Admiral Beechey.)

self, what could the prize crew do? If they had the prisoners down in the hold, they could keep them there by the threat of firing among them if they tried to come up; but to keep them down would do nothing towards saving the ship or the lives of those on board. It would not man the pumps, or help to rig jury masts. And if the prisoners of war were called upon to help? If they were under control of their own officers, they would almost certainly begin by recapturing the ship, as they could easily do, being six, ten, or even more to one. If they had, by losses in battle, no officers left, general insubordination and confusion would be likely to result, as was the case in the *Fougueux*. It was a choice of evils, for in such circumstances no captors would keep their prisoners below to be drowned without a chance for their lives. The only real remedy was to take care that the captured ship should be overawed by the presence of superior force, for as long as she was virtually under the guns of an effective man-of-war, whether towing her or merely keeping her company, the weakness of the prize crew actually on board did not endanger her.

This was the normal safeguard; but in many cases it was withdrawn on the 22nd October and the following days by force of circumstances.

Thus on the morning of the 22nd the *Algéciras*, which had borne the flag of Rear-Admiral Magon, was adrift from her towing ship in the same manner as the *Fougueux*, and not far from that ship. The

prize crew called upon the prisoners to help to save the ship : to bring her to an anchor, to pump, to rig jury masts. But this crew had some officers left, and was therefore able to act as a disciplined whole. A lieutenant took command and represented the case thus to the captors : The prisoners would not save the ship for the English : sooner than do so they would let her drown all hands. If set free, they would work to save her, but only on the understanding that they became top-dog, and that the ship reverted to the French flag ; and if the English prize crew accepted these terms, they would be set free when the ship reached Cadiz. For fifty men against 300 it was a choice between acceptance and death. The *Algéciras* was therefore recaptured, and soon made her way into Cadiz, which was close under her lee.

The *Redoubtable*, which had suffered in proportion to her very gallant resistance, sank on the night of the 22nd when in tow of the *Swiftsure*. During the afternoon as the gale increased she made signals of distress, and towards evening the *Swiftsure*, seeing that the ship could not be saved, hoisted out her boats to rescue the men. They succeeded in saving the prize crew and 169 Frenchmen, of whom seventy were wounded, and thirty-six more were picked up next morning, having been floating about on rafts all through the night. This left 438 of the *Redoubtable's* crew unaccounted for, but this figure includes the killed in action and many wounded. Indeed if the statement is true

that the ship lost 300 killed in action and 220 wounded, it would appear that all the unwounded members of the crew must have been saved, and therefore that the ship took down with her only her dead, and such of the wounded as it had not been possible to get into the boats. To get into a boat from a water-logged, dismasted ship, wallowing in a heavy sea, is a gymnastic exercise for a whole man ; that it was possible to save even seventy of the wounded implies much courage, skill and patience on the part of the rescuing boats.

The next day, the 23rd, began with somewhat finer weather. The wind had fallen, though the sea still ran high. The fleet, both English ships and prizes, was at this time abreast Cadiz, and much scattered. The prizes, being the most shattered and the worst manned, had been driven nearest to the shore.

The enemy in Cadiz decided to take advantage of this state of affairs, and in the morning made a sortie with a squadron of five line-of-battle ships, as many frigates, and a few smaller vessels to see what they could pick up. At their approach Collingwood signalled to form a line of battle and prepare for action, and succeeded in forming a line of ten sail. This was more than were necessary, and perhaps had the admiral been content with six or seven he might have got a chance of striking. But the enemy's force was not clearly made out, several of the frigates which accompanied it being, in the thick weather, mistaken for line-of-battle

ships. The common belief seems to have been that ten of the enemy ships were of the line of battle.

In the event, while the English were forming, the enemy had a little leisure, and employed it to advantage. The ships nearest the coast had been forced to let slip the prizes they had in tow, in order to take their places in the line ; and of those thus abandoned the enemy succeeded in pouncing on two, the *Santa Ana*, a first rate which had been a Spanish flagship at Trafalgar, and the *Neptuno*, a Spanish eighty-gun ship. The *Bucentaure*, which was Villeneuve's flagship in the battle, was almost within their reach, but not quite. As the English drew into line the enemy saw that they could do no more, and turned homeward with their two prizes. As they did so the gale sprang up again.

But although they had so short a way to go there was room for disaster. Of the five line-of-battle ships which came out only two got back home again ; and of the two rescued prizes, one. The French *Indomptable* missed her way into Cadiz, drove across the bay, and was wrecked at Rota, with a loss, as was supposed, of over 1,000 lives. She had extra hands on board, who were to have manned the prizes which it was hoped would be captured. Also the *Bucentaure* had driven ashore, and the *Indomptable* had rescued some of her crew, who, poor fellows, thus gained no long respite. The Spanish *San Francisco de Asis* anchored at the entrance to the harbour, but was driven from her

anchors by the gale and wrecked in Cadiz Bay. The *Rayo*, a 100-gun ship, could not get in, and anchored outside. There she rolled her masts away, and on the 24th surrendered on the approach of two English ships. It was impossible to move her as long as the gale continued, but the English succeeded in taking some of her crew out of her. A couple of days later she parted her cables and drove ashore, with the loss of many of her people and some of the prize crew. The English set fire to her wreck.

The rescued prize *Neptuno* had a similar fate. She, too, like the *Rayo*, was driven to leeward of her port and compelled to anchor. Also, like the *Rayo*, she, too, drove from her anchors, went ashore, and was there burnt by the English. It will be seen that the sortie was productive of nothing save wholesale destruction. Directly or indirectly it deprived the English of three of their prizes ; of these three the enemy saved only one, and in so doing lost three more ships in addition to those which they had lost in the battle. Such was the price of that daring attempt to carry out operations of war with damaged ships in a gale of wind and on a lee-shore.

But in spite of this wholesale destruction the tale of losses was not yet complete. In addition to those already mentioned, the next day, the 24th, saw the loss of three more of the prizes.

Of these the most important was the *Santisima Trinidad*, the largest man-of-war in the world.

The English had a peculiar affection for this ship, partly no doubt on account of her size and her four complete tiers of guns, but chiefly because they considered that she ought long since to have been theirs. She had been badly hammered at the battle of Cape St. Vincent in 1797, and had hauled down her colours, but it had not been possible to take possession of her. The *Victory* and several other ships had hammered her still more severely at Trafalgar, killing 254 and wounding 173 of her complement of 1,048; but she had fought on stubbornly till all her masts went away together. Then she surrendered. As she lay like a log on the water there was no need to hasten to take possession of her while other more urgent work remained to be done, and it was 6.25, nearly an hour after the last shot was fired, before the *Prince* sent a party of hands on board her. At eleven that night the *Prince* took her in tow.

The *Trinidad* broke adrift on the afternoon of the 22nd, and could not be taken in tow again till the next morning. When the enemy came out of Cadiz during the lull in the gale the *Prince* cleared for action, but she did not let go of the tow. During the following night, the wind blowing a gale from the southward, the disabled prizes which remained were driven another twenty miles up the coast, to beyond San Lucar. The position on the morning of the 24th seemed so desperate that Collingwood gave up hope of saving the prizes, and made the signal to destroy them. This is

how the *Prince's* log describes what then took place :

“ At 9 a.m. answered the signal to destroy prizes. Cast off the tow, hove to, out launch and pinnace, and brought prisoners on board. Strong breezes and a heavy swell. At noon *Neptune* and *Ajax* came to assist with boats. Cadiz S.E. 7 leagues. Some dismasted ships at anchor. Others driving to the shore with anchors.

“ P.M.—Employed all boats all the afternoon fetching prisoners on board. Got on board, supposed, 500 men, and a many wounded. Cut away the prize's anchors, and began to scuttle her decks. . . . At 9 parted from the prize. . . . Got a range of cable up, being within 5 miles of the shore. . . . Expended, per captain's order, shirts, trousers, frocks, beds, blankets, shoes and stockings to naked prisoners.”

Personal narratives are more picturesque, but vary considerably. It is uncertain from them whether the whole of the crew was saved or not. A lieutenant of the *Ajax* wrote that every life on board was saved, down to the ship's cat, which ran out on a lower deck gun and was taken off by the last boat ; but an officer of the *Prince* said that thirty-three or thirty-four of the most badly wounded, whom it was impossible to move, went down with the ship. “ To remove the prisoners,” he wrote, “ now became a most dangerous task ; no boats could lie alongside, we got under her stern, and the men dropped in by ropes ; but what a

sight when we came to remove the wounded. . . . We had to tie the poor mangled wretches round their waists, or where we could, and lower them down into a tumbling boat, some without arms, others no legs, and lacerated all over in the most dreadful manner." Small wonder that it seemed as merciful to leave a few of the worst cases to drown. And the experience of these wounded men was, it is to be remembered, repeated in many other cases during those days of storm.

The *Intrépide*, a ship which had behaved nobly on the 21st, was destroyed on the 24th. The *Britannia* had been towing her, but had to cast her off on the morning of the 23rd in order to take her place in the line of battle, whereby the *Intrépide* got into a hopeless position. It would therefore be possible to regard her as one more victim of Cosmao's sortie. Her destruction is succinctly treated in the *Britannia's* log: "The boats employed bringing prisoners from a prize. P.M.—Cleared the prize of men and set her on fire. Strong gales and squally, with lightning and rain."

The Spanish prize *Monarca*, which had had most of her complement and part of the prize crew already taken out of her in preparation for destroying her, parted from her anchors off San Lucar on the same night, drove ashore, and went to pieces.

The *Aigle*, a French seventy-four, had driven very near to Cadiz in the gale of the 22nd. Her captor, the *Defiance*, stood after her and persisted

in her efforts to take her in tow until within three miles of Cadiz lighthouse. What followed, or rather what did not follow, seems distinctly mysterious. One would assume, as a matter of course, that the *Aigle* would be snapped up by Cosmao's squadron on the 23rd ; but, for whatever reason, she was not. Instead she held on at anchor till the 25th, on which day it blew harder than ever ; and that night she drove and went ashore near St. Mary Port in Cadiz Bay.

The weather improved by degrees after the 25th, but three more of the prizes perished. The first was the *Berwick*, originally an English ship, but captured by the French in 1795, and therefore in their hands for ten years before she reverted to the English flag at Trafalgar. She was riding safely off San Lucar waiting for a shift of wind, when her French crew contrived to cut her cables. Efforts were made to pick her up before she grounded, but without avail. The English managed to save most of the crew, but some 200 perished by their own rash act.

The destruction ended with the *San Augustin* and the *Argonauta*, both Spaniards, the first of which was burnt and the other scuttled by the English on the 29th. The *San Augustin* was an old ship and probably little worth ; but it seems inexplicable why the *Argonauta* should have been destroyed. She was a particularly fine eighty-gun ship and quite new, and, as far as can be seen from the logs, the weather was moderate and no danger

threatened her at the time when she was cleared of her crew and scuttled at her anchors.

After her destruction there remained in our hands only four of the many prizes taken in the battle, and these four reached Gibraltar in safety, one of them being French, the others Spanish. Not one of the four, however, was an efficient ship, all being old and in bad condition, and fit for nothing but harbour service.

It appears therefore that, directly or indirectly, the gales which blew from the 22nd to the 25th caused the loss of no less than fourteen line-of-battle ships which had been captured by the English, as well as of two, one French and one Spanish, which had not. How far this enormous loss, accompanied by corresponding loss of life, was necessary has been, and will continue to be disputed. But from what has been said here it is apparent that the course adopted by Collingwood on the 21st was both difficult and dangerous; so much so indeed as to suggest that quite probably Nelson was right after all, and that it would have been better to anchor the fleet as near as possible to the scene of the battle.

CHAPTER VIII

WINDY CORNERS

SAILORS tell of many windy corners, such as Cape Horn, the Cape of Good Hope, Hatteras, the Leeuwin, Cape Clear, and many others, most of which have their own individual peculiarities.

Pre-eminent among them all stands Cape Horn, bearing a reputation so great that, as men who have made the passage round it under sail die out, it may come, by a natural revulsion, to be regarded as one more of the exaggerated terrors of the sea, on a par with the maleficent deities of the ancients, or the quaint sea-monsters of the Middle Ages. The passing of sail, by depriving the passage through the Straits of Magellan of most of its difficulties, and the opening of the alternative route by the Panama canal, have together removed the necessity of struggling against the persistent gales and grey beards of those high southern latitudes ; and the test of a seaman is no longer, as it was interpreted to be by Paddy West, that he has been " three times round Cape Horn."

Whether Drake on his famous voyage of circumnavigation actually discovered Cape Horn or not is relatively a small matter, for it is certain that, albeit by accident, he discovered that there was

an open sea passage from east to west beyond Tierra del Fuego, and, what is more to our purpose, he discovered Cape Horn weather. "No traveller hath felt, neither hath there ever been such a tempest, that any records make mention of, so violent and of such continuation since Noah's flood, for it lasted from Sept. 7th to Oct. 28th full fifty-two days."

Many, since Winter despaired of finding Drake again, have turned back, defeated by the persistent westerly gales and the tremendous sweep of the ocean running unfettered round the world ; some, unable to force their way round, but determined to make their voyage, have turned east from the neighbourhood of the Cape to run round the world in the "roaring forties," and eventually to reach the coast of America from the westward.

There is no other promontory but Cape Horn which thrusts itself down into the region of the great westerly winds. The Cape of Good Hope—the old "Cape of Storms"—and Cape Leeuwin approach most nearly to it, for during the southern winter the westerly gales extend themselves north to their latitudes ; nevertheless the bad repute of the "Cape of Storms" is not due entirely to the winds which are there met with. This cape, like Cape Horn, stands in navigation as the symbol of a district rather than as one definite point ; it is not the cape only which is stormy and hard to round, there is an adverse ocean current along the whole southern and south-eastern coast of Africa ; and

when this, the Agulhas current, is opposed by a gale of wind, a terrible sea is raised, not only heavy, but incredibly steep and hollow. Many ships from the days of the Portuguese carracks onwards have succumbed to this sea : many have disappeared in it, as did the mail steamer *Waratah* in 1909, without leaving any certain trace of what befel them.

Any one who has turned to windward against a strong breeze in a small vessel with a hot tide under him, as may be done constantly in the eastern part of the English Channel, in the estuary of the Thames, or of any great river, knows how hard a sea is raised by such conditions. Every sea is hollow-faced, white crested and dangerous ; and the seas are so close together that it looks well-nigh impossible that a vessel could rise to each in turn. From a knowledge of these conditions on a moderate scale it becomes easy to believe that that naval officer spoke no more than the truth who described how, from the poop of the old full-rigged steam frigate *Bacchante*, he saw, when in the Agulhas current, the crest of the next sea over the fore truck. The ship was short, she was poised on the crest of a wave at the extreme angle for her downward send, and—though this left no impression on the observer—she was probably rolling heavily ; also, as is obvious from the event, she rose in time to meet the sea and rise over it. If Cape Horn holds the record for the length of seas, the Agulhas current bears the palm for steepness.

Cape Hatteras, as has been seen in Chapter V., behaves ill in the hurricane months because it projects into the path of those storms ; but it is a stormy cape at all seasons of the year :

“ If the Bermudas let you pass,
You must beware of Hatteras.”

This is usually set down to the credit of the Gulf Stream, which during its progress up the American seaboard breeds its own weather, gloomy skies, thick mists, with frequent squalls and gales. But at any time of the year, especially in the winter, the whole track between Bermuda and Hatteras is subject to westerly and north-westerly gales, a peculiarity which it shares with other districts which lie between the lower limit of the westerlies and upper margin of the trade winds. There are few great capes anywhere which have not at least a local reputation as breeders of gales of wind ; that the one pronounced cape in a notoriously unsettled region should be of ill repute was inevitable.

Michael Scott wrote neither history nor science, but when he described the seas of the American coast and the West Indies he wrote of the thing that he knew ; and this is what he says of the Bermudas-Hatteras region :

“ We sailed in the evening with the moon at full, and the wind at west-north-west. So soon as we got from under the lee of the land the breeze struck us, and it came on to blow like thunder, so that we

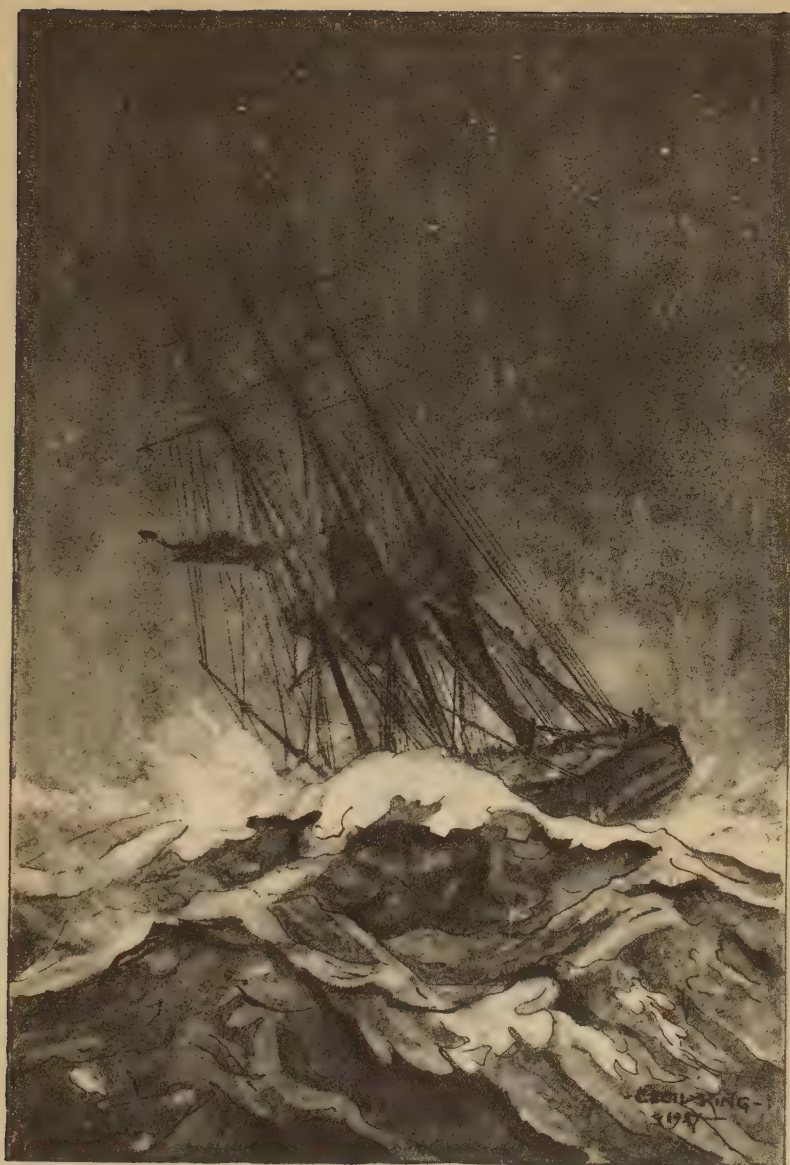
were all soon reduced to our storm stay-sails ; and there we were transports, merchantmen, and men-of-war, rising on the mountainous billows one moment, and the next losing sight of everything but the water and sky in the deep trough of the sea, while the seething foam was blown over us in showers from the roaring waves. But overhead, all this while, it was as clear as a lovely winter moon could make it, and the stars shone brightly in the deep blue sky ; there was not even a thin fleecy shred of cloud racing across the moon's disk. Oh the glories of a north-wester ! ”

The north-wester in the northern hemisphere has the distinction of frequently bringing clean weather : here, for example, is a detailed account from Dana of a gale from that quarter met with in 1835 by the American ship *Alert* off Cape Concepcion, another notoriously windy corner. It is not without interest that Cape Concepcion stands in almost the same latitude as Hatteras, and therefore equally in the no man's land between the belts of the brave westerlies and of the trade winds. But it has, unlike Hatteras, no Gulf Stream to complicate its climate. Hear, then, what Dana says :

“ Saturday, November 14th. This day we got under weigh (from Santa Barbara) bound up to Monterey.

“ Everything being now ready, and the passengers aboard, we ran up the ensign and broad pennant (for there was no man-of-war, and we

were the largest vessel on the coast), and the other vessels ran up their ensigns. Having hove short, cast off the gaskets, and made the bunt of each sail fast by the jigger, and with a man on each yard ; at the word, the whole canvas of the ship was loosed, and with the greatest rapidity possible, everything was sheeted home and hoisted up, the anchor tripped and catheaded, and the ship under headway. We were determined to show the ' spouter ' how things could be done in a smart ship, with a good crew, though not more than half their number. The royal yards were all crossed at once, and royals and sky-sails set, and, as we had the wind free, the booms were run out, and every one was aloft, active as cats, laying out on the yards and booms, reeving the studding-sail gear ; and sail after sail the captain piled upon her, until she was covered with canvas, her sails looking like a great white cloud resting upon a black speck. Before we doubled the point, we were going at a dashing rate, and leaving the shipping far astern. We had a fine breeze to take us through the Canal, as they call this bay of forty miles long by ten wide. The breeze died away at night, and we were becalmed all day on Sunday about half way between Santa Barbara and Point Concepcion. Sunday night we had a light, fair wind, which set us up again ; and having a fine sea-breeze on the first part of Monday, we had the prospect of passing without any trouble, Point Concepcion—the Cape Horn of California, where it begins to blow the



THE "ALERT" IN A NORTH-WESTER.

Drawn by Cecil King, R.I.

first of January, and blows all the year round. Toward the latter part of the afternoon, however, the regular north-west wind, as usual, set in, which brought in our studding sails, and gave us the chance of beating round the Point, which we were now just abreast of, and which stretched off into the Pacific, high, rocky and barren, forming the central point of the coast for hundreds of miles north and south. A cap-full of wind will be a bag-full here, and before night our royals were furled, and the ship was laboring hard under her top-gallant sails. At eight bells our watch went below, leaving her with as much sail as she could stagger under, the water flying over the forecastle at every plunge. It was evidently blowing harder, but then there was not a cloud in the sky, and the sun had gone down bright.

“ We had been below but a short time, before we had the usual premonitions of a coming gale : seas washing over the whole forward part of the vessel, and her bows beating against them with a force and sound like the driving of piles. The watch, too, seemed very busy trampling about decks, and singing out at the ropes. A sailor can always tell, by the sound, what sail is coming in, and, in a short time, we heard the top-gallant sails come in, one after another, and then the flying jib. This seemed to ease her a good deal, and we were fast going off to the land of Nod, when—bang, bang, bang—on the scuttle, and ‘ All hands, reef top-sails, ahoy,’ started us out of

our berths ; and, it not being very cold weather, we had nothing extra to put on, and were soon on deck. I shall never forget the fineness of the sight. It was a clear, and rather a chilly night ; the stars were twinkling with an intense brightness, and as far as the eyes could reach, there was not a cloud to be seen. The horizon met the sea in a definite line. A painter could not have painted so clear a sky. There was not a speck upon it. Yet it was blowing great guns from the north-west. When you can see a cloud to windward, you feel that there is a place for the wind to come from ; but here, it seemed to come from nowhere. No person could have told, from the heavens, by their eyesight alone, that it was not a still summer's night. One reef after another, we took in the top-sails, and before we could get them hoisted up, we heard a sound like a short, quick rattling of thunder, and the jib was blown to atoms out of the boltrope. We got the top-sails set, and the fragments of the jib stowed away, and the fore top-mast stay-sail set in its place, when the great main-sail gaped open, and the sail ripped from head to foot. ' Lay up on that main-yard and furl the sail, before it blows to tatters,' shouted the captain ; and in a moment, we were up, gathering the remains of it upon the yard. We got it wrapped round the yard, and passed gaskets over it as snugly as possible, and were just on deck again, when, with another loud rent, which was heard throughout the ship, the fore top-sail, which had been double-

reefed, split in two, athwartships, just below the reef band, from earing to earing. Here again it was down yard, haul out reef-tackles, and lay out upon the yard for reefing. By hauling the reef-tackles chock-a-block, we took the strain from the other earings, and passing the close-reef earing, and knotting the points carefully, we succeeded in setting the sail, close-reefed.

“ We had but just got the rigging coiled up, and were waiting to hear ‘ go below the watch,’ when the main royal worked loose from the gaskets and blew directly out to leeward, flapping, and shaking the mast like a wand. Here was a job for somebody. The royal must come in or be cut adrift, or the mast would be snapped short off. All the light hands in the starboard watch were sent up, one after another, but they could do nothing with it. At length, John, the tall Frenchman, the head of the starboard watch (and a better sailor never stepped upon a deck) sprang aloft, and, by the help of his long arms and legs, succeeded, after a hard struggle—the sail blowing over the yard arm to leeward, and the sky-sail blowing directly over his head—in smothering it, and frapping it with long pieces of sinnet. He came very near being blown or shaken from the yard several times, but he was a true sailor, every finger a fish-hook. Having made the sail snug, he prepared to send the yard down, which was a long and difficult job ; for frequently he was obliged to stop and hold on with all his might for several minutes, the ship

pitching so as to make it impossible to do anything else at that height. The yard at length came down safe, and after it, the fore and mizzen royal-yards were sent down. All hands were then sent aloft, and for an hour or two we were hard at work, making the booms well fast ; unreeving the stud-ding-sail and royal and sky-sail gear ; getting rolling ropes on the yards ; setting up the weather breast-backstays ; and making other preparations for a storm. It was a fine night for a gale ; just cool and bracing enough for quick work, without being cold, and as bright as day. It was sport to have a gale in such weather as this. Yet it blew like a hurricane. The wind seemed to come with a spite, an edge to it, which threatened to scrape us off the yards. The mere force of the wind was greater than I had ever seen it before ; but darkness, cold, and wet are the worst parts of a storm to a sailor.

“ Having got on deck again, we looked round to see what time of night it was, and whose watch. In a few minutes the man at the wheel struck four bells, and we found that the other watch was out, and our own half out. Accordingly, the starboard watch went below, and left the ship to us for a couple of hours, yet with orders to stand by for a call.

“ Hardly had they got below, before away went the fore top-mast stay-sail, blown to ribbons. This was a small sail, which we could manage in the watch, so that we were not obliged to call up the

other watch. We laid out upon the bowsprit, where we were under water half the time, and took in the fragments of the sail, and as she must have some head sail on her, prepared to bend another stay-sail. We got the new one out, into the nettings ; seized on the tack, sheets, and halyards, and the hanks ; manned the halyards, cut adrift the frapping lines, and hoisted away ; but before it was half way up the stay it was blown all to pieces. When we belayed the halyards, there was nothing left but the bolt-rope. Now large eyes began to show themselves in the foresail, and knowing that it must soon go, the mate ordered us upon the yard to furl it. Being unwilling to call up the watch who had been on deck all night, he roused out the carpenter, sailmaker, cook, steward, and other idlers, and, with their help, we manned the fore-yard, and, after nearly half an hour's struggle, mastered the sail, and got it well furled round the yard. The force of the wind had never been greater than at this moment. In going up the rigging, it seemed absolutely to pin us down to the shrouds ; and on the yard, there was no such thing as turning a face to windward. Yet here was no driving sleet, and darkness, and wet, and cold, as off Cape Horn ; and instead of a stiff oil-cloth suit, south-wester caps, and thick boots, we had on hats, round jackets, duck trousers, light shoes, and everything light and easy. All these things made a great difference to a sailor. When we got on deck, the man at the wheel struck eight bells (four

o'clock in the morning), and 'All starboardlines, ahoy' brought the other watch up. But there was no going below for us. The gale was now at its height, 'blowing like scissors and thumb-screws'; the captain was on deck; the ship, which was light, rolling and pitching as though she would shake the long sticks out of her; and the sails gaping open, splitting in every direction. The mizzen top-sail, which was a comparatively new sail, and close-reefed, split, from head to foot, in the bunt; the fore topsail went, in one rent, from clew to earing, and was blowing to tatters; one of the chain bobstays parted; the sprit-sail yard sprung in the slings; the martingale had slued away off to leeward; and, owing to the long dry weather, the lee rigging hung in large bights at every lurch. One of the main top-gallant shrouds had parted; and, to crown all, the galley had got adrift, and gone over to leeward, and the anchor on the lee bow had worked loose, and was thumping the side. Here was work enough for all hands for half a day. Our gang laid out on the mizzen top-sail yard, and after more than half an hour's hard work, furled the sail, though it bellied out over our heads, and again, by a slat of the wind, blew it under the yard with a fearful jerk, and almost threw us off from the footropes.

"Double gaskets were passed round the yards, rolling tackles and other gear bowsed taut, and everything made as secure as could be. Coming down, we found the rest of the crew just laying

down the fore rigging, having furled the tattered top-sail, or, rather, swathed it round the yard, which looked like a broken limb bandaged. There was no sail now on the ship but the spanker and the close-reefed main top-sail, which still held good. But this was too much after sail ; and order was given to furl the spanker. The brails were hauled up, and all the light hands in the starboard watch sent out on the gaff to pass the gaskets ; but they could do nothing with it. The second mate swore at them for a parcel of ' soggers,' and sent up a couple of the best men ; but they could do no better, and the gaff was lowered down. All hands were now employed in setting up the lee rigging, fishing the sprit-sail yard, lashing the galley, and getting tackles upon the martingale, to bowse it to windward. Being in the larboard watch, my duty was forward, to assist in setting up the martingale. Three of us were out on the martingale guys and back-ropes for more than half an hour, carrying out, hooking and unhooking the tackles, several times buried in the seas, until the mate ordered us in, from fear of our being washed off. The anchors were then to be taken up on the rail, which kept all hands on the forecastle for an hour, though every now and then the seas broke over it, washing the rigging off to leeward, filling the lee scuppers breast high, and washing chock aft to the taffrail.

“ Having got everything secure again, we were promising ourselves some breakfast, for it was now

nearly nine o'clock in the forenoon, when the main top-sail showed evident signs of giving way. Some sail must be kept on the ship, and the captain ordered the fore and main spencer gaffs to be lowered down, and the two spencers (which were storm sails, brand new, small, and made of the strongest canvas) to be got up and bent ; leaving the main top-sail to blow away, with a blessing on it, if it would only last until we could set the spencers. These we bent on very carefully, with strong robands and seizings, and making tackles fast to the clues, bowsed them down to the waterways. By this time the main top-sail was among the things that have been, and we went aloft to stow away the remnant of the last sail of all those which were on the ship twenty-four hours before. The spencers were now the only whole sails on the ship, and being strong and small, and near the deck, presenting but little surface to the wind above the rail, promised to hold out well. Hove-to under these, and eased by having no sail above the tops, the ship rose and fell, and drifted off to leeward like a line-of-battle ship.

“ It was now eleven o'clock, and the watch was sent below to get breakfast, and at eight bells (noon), as everything was snug, although the gale had not in the least abated, the watch was set, and the other watch and idlers sent below. For three days and three nights the gale continued with unabated fury, and with singular regularity. There were no lulls, and very little variation in its

fierceness. Our ship, being light, rolled so as almost to send the fore yard-arm under water, and drifted off bodily to leeward. All this time there was not a cloud to be seen in the sky, day or night ; no, not so large as a man's hand. Every morning the sun rose cloudless from the sea, and set again at night in the sea in a flood of light. The stars, too, came out of the blue, one after another, night after night, unobscured, and twinkled as clear as on a still frosty night at home, until the day came upon them. All this time, the sea was rolling in immense surges, white with foam, as far as the eye could reach, on every side, for we were now leagues and leagues from shore.

“ The between-decks being empty, several of the others slept there in hammocks, which are the best things in the world to sleep in during a storm ; it not being true of them, as it is of another kind of bed, ‘ when the wind blows, the cradle will rock ’ ; for it is the ship that rocks, while they always hang vertically from the beams. During these seventy-two hours we had nothing to do but to turn in and out, four hours on deck, and four below, eat, sleep, and keep watch. The watches were only varied by taking the helm in turn, and now and then by one of the sails, which were furled, blowing out of the gaskets, and getting adrift, which sent us up on the yards ; and by getting tackles on different parts of the rigging which were slack. Once, the wheel-rope parted, which might have been fatal to us, had not the

chief mate sprung instantly with a relieving tackle to windward, and kept the tiller up, till a new one could be rove. On the morning of the twentieth, at day-break, the gale had evidently done its worst, and had somewhat abated ; so much so, that all hands were called to bend new sails, although it was still blowing as hard as two common gales. One at a time, and with great difficulty and labour, the old sails were unbent and sent down by the buntlines, and three new top-sails, made for the homeward passage round Cape Horn, and which had never been bent, were got up from the sail-room, and, under the care of the sailmaker, were fitted for bending, and sent up by the halyards into the tops, and, with stops and frapping lines, were bent to the yards, close-reefed, sheeted home and hoisted. These were done one at a time, and with the greatest care and difficulty. Two spare courses were then got up and bent in the same manner and furled, and a storm-jib, with the bonnet off, bent and furled to the boom. It was twelve o'clock before we got through ; and five hours of more exhausting labour I never experienced ; and no one of the ship's crew, I will venture to say, will ever desire again to unbend and bend five large sails in the teeth of a tremendous north-wester. Towards night, a few clouds appeared in the horizon, and as the gale moderated, the usual appearance of driving clouds relieved the face of the sky. The fifth day after the commencement of the storm, we shook a reef out of each top-sail,

and set the reefed fore-sail, jib, and spanker ; but it was not until after eight days of reefed top-sails that we had a whole sail on the ship ; and then it was quite soon enough, for the captain was anxious to make up for leeway, the gale having blown us half the distance to the Sandwich Islands."

CHAPTER IX

THE TAY BRIDGE DISASTER

THE railway bridge over the Tay at Dundee was opened to traffic on June 1st, 1878, having been seven years in building. On December 28th, 1879, during a storm from the westward, a large part of the bridge gave way while a train was crossing it, and fell with the train into deep water. Of the seventy-five persons in the train not one survived the accident. The news of this disaster made a profound impression, amounting to consternation. Even when it was recognised that a gale of exceptional severity was blowing at the time, it seemed inexplicable that a new bridge of the first importance should fall thus without the least warning; and the result of the official inquiry into the causes of the loss was therefore awaited with much interest and some anxiety.

The bridge, which carried only a single track, was two miles long from shore to shore, consisting of a superstructure of lattice iron girders resting on eighty-five piers. The spans inshore were short, but across the navigable part of the channel they were long, eleven being 245 feet from pier to pier, and two 227 feet, making a total length of 3,149 feet for this part of the bridge. In order to afford

headroom for the passage of shipping, the girders were raised in these long spans, so that the track was carried by their lower edges ; at the shoreward ends of the bridge the track was carried on the upper edges of the girders. Across the long spans the girders were 27 feet deep ; and as they rose above the floor by nearly the whole of that amount, the bridge, as seen from the side, was very noticeably raised in that portion of it which crossed the deep water channel. These were known as the " high girders." It has been necessary to describe this section of the bridge in some detail, for it was this part, 1,050 yards long, which fell.

The inquiry was directed to discovering whether the bridge was suitably designed, properly constructed, and well maintained ; and whether the accident was due to any fault in the bridge itself, or to stress of weather. It began with the examination of officials concerned with the forwarding of the train, of eye-witnesses who had seen the train disappear, and of others who could speak with special knowledge as to the weather conditions prevailing. It went on to the technical questions of engineering involved, the divers who found the train, the responsible engineers and railway officials and representatives of the contractors being examined. In the event the commissioners were unanimous in their findings, though they were not prepared to go quite so far as their chairman desired. They considered their duty ended with the discovery of causes : the chairman held that

it should include the apportionment of the responsibility for the disaster. He therefore presented a minority report, agreeing in the decisions of his colleagues, but dotting the i's and crossing the t's in a decidedly courageous manner.

The train which fell was bound from Edinburgh to Dundee, calling at intermediate stations. The day was a Sunday, and the train therefore was a short one, being composed of six coaches and a brake van, and even so it was nothing like full, the number of passengers averaging only a dozen to a coach. The coaches were four-wheeled, with the exception of one, a first, which was six-wheeled. The length of the train was therefore very moderate, totalling only 224 feet 6 inches. Its side area was 1,758 square feet, and its weight, engine and all, was 114 tons 14 cwt. The part of the bridge which fell was no less than fourteen times as long as the train. It appeared therefore to be a very interesting question whether the bridge blew away and carried the train with it, or whether the train broke the bridge down. It was not known immediately how the train went, for the accident happened at night, and though there was a moon the sky was overcast. There were eye-witnesses ashore, but in the nature of things none of them could be nearer than about a mile to the scene of the accident. Had the train started the mischief by breaking down a span and dropping through, perhaps coach after coach? Or had the force of the wind tilted the whole structure over sideways?

The first information came from the divers, who located the train on the second day of their search.

The doomed train stopped at St. Fort station, the last before crossing the bridge, and there, as was usual, the tickets of passengers for Dundee were collected. This was how it was known how many were in the train : there were seventy-five, five of the company's servants and seventy passengers.

After leaving St. Fort the train reached the signal cabin at the south end of the bridge at 7.13, its proper time. In accordance with a regulation of the company it slowed down at the cabin to a walking pace, nominally three miles an hour, in order that the signalman might hand to the driver the "train-staff," without which he was not permitted to pass on to the bridge. All was well at this point ; the signalman returned to his cabin and signalled the train on to the cabin at the north end of the bridge, having done which he busied himself about his other duties and paid no further heed to the train.

It so chanced, however, that a man named John Watt, another employee of the railway company, being a friend of the signalman and not on duty, had come to spend part of the evening in the cabin. After the train had passed, Watt, having nothing to do, stood watching its progress over the bridge from the window at the north end of the cabin. It was blowing a strong gale at the time

at about W.S.W., which was almost directly across the bridge ; also it was very dark, for heavy clouds obscured the full moon.

When the train had gone about 200 yards down the line, Watt, looking after it, saw a continuous stream of sparks coming from the wheels ; and he saw these sparks for as far as the train went. They were formed, as was supposed, by the force of the wind binding the wheels taut against the lee rails. Watt's examination as to what happened next ran thus :—

“ How long after your attention was first directed to the sparks was it before the train disappeared from your sight ? ”—“ It would not have been more than three minutes, anyhow.”

“ What distance do you suppose the train had reached from the south cabin when it disappeared ? ”—“ About three-quarters of a mile.”

“ Had the train by that time got on to that part of the bridge which spanned the navigable channel ? ”—“ Yes.”

“ It had come upon the high arches which were left for purposes of navigation ? ”—“ Yes.”

“ Did it disappear from your sight suddenly ? ”—“ Yes, the tail lights of the train disappeared just in a moment.”

“ Up to that time you had had them fully in view ? ”—“ Up to that time I had had them fully in view the whole way.”

“ Was there anything else to attract your attention except the sparks which you have told



THE TAY BRIDGE FROM THE NORTH.

(From a Drawing in the Illustrated London News.)

us about, and the sudden disappearance of the tail lamps ? ” — “ Yes.”

“ What was it ? ” — “ There were great flashes of fire before the tail lamps went out, greater flashes than those I had seen continuously before.”

“ Do you mean that there were intermittent flashes of light different from the spark stream that you had been observing ? ” — “ Yes, a flash of light.”

“ One flash ? ” — “ One great flash of light.”

“ When that great flash of light disappeared the tail lamps disappeared ? ” — “ Yes.”

“ Immediately afterwards ? ” — “ Immediately afterwards ; they all disappeared at one time, the tail lamps and the fire.”

“ Having seen these things, did you say anything to Barclay (the signalman) ? ” — “ Yes, I said there must be something wrong with the train. I thought the train was over the bridge.”

Barclay, however, did not at once fall in with this suggestion. From the high girders, where the train was when last seen, the line ran down a sharp incline to the northern shore ; and he thought that she had disappeared by having started down the incline. It will be noticed that his theory ignored the flashes which had impressed Watt ; he had not seen them, and if Watt had found time to mention them, as it may be supposed he did, they had lost in the telling. Indeed from his evidence one seems to picture Watt as a stolid person, not very swift of thought, and certainly

not voluble. A chatterbox would not be a welcome visitor in a signal cabin, and it is clear that Watt was welcome. He had been there often before the night of December 28th.

At the bottom of the downward incline the line ran round a curve into Dundee. If the train was all right, and had merely become masked by the slope, her lights would presently reappear on the curve, and Barclay stood for a short time waiting for them to do so. In two or three minutes, as there was still no sign of the train, he went to the signal instruments to communicate with the cabin at the other end of the bridge. There were three instruments, but all were interrupted.

Then it came upon the watchers that more than an accident to the train itself was in question : it was certain that some damage had been done to the bridge. They went down on to the line, and started to go along the bridge to find out what it was. But they could not go very far owing to the force of the wind. As Watt said in evidence, " It was that stormy I could not walk. . . . It was blowing very heavy at that time " ; and to the question " It blows pretty high in the Tay sometimes ? " he answered, " Never so high as on that night that ever I experienced." So, being unable to walk on the exposed surface of the bridge, the men turned to the eastward, where they would have some shelter " to see if we could see anything of the bridge from the seashore." At first owing to the darkness they saw nothing ; but after going

backwards and forwards from east to west, at about eight o'clock they were able to see that part of the bridge was gone.

The signalman in the corresponding cabin at the north end of the bridge saw nothing of the accident, and heard nothing. It is testimony to the din which the storm was making that neither these men, whose business it was to pass the train over the bridge, nor any one of the several persons who saw the accident from the shore, heard anything of the crash which the bridge must have made when it broke away.

It appeared in evidence that every person officially connected with the bridge had perfect faith in its strength ; but the inquiry revealed also that some of the citizens of Dundee were by no means so confident. Hence it happened that there were eye-witnesses of the disaster. Some men, in spite of the tearing wind, had gone out on purpose to see how the bridge would stand the gale ; others, whose windows commanded a view of the bridge, stood watching for the train to pass over it. One or two had watched the passage of the train before that which was lost, for even then, an hour before the time of the disaster, the gale was severe. They had seen nothing but some sparks from the wheels, such as John Watt noticed again an hour later. The mere fact of this interest, when the bridge was half-way through its second winter, and had already stood a number of gales of normal winter violence, shows that the gale of

December 28th impressed men's minds as being something quite out of the ordinary.

The bridge stood 88 feet above the water in its middle part. According to the original design it was to have been carried on brick piers; but before the work got very far it was found that the bottom of the river was not firm enough to bear their weight. It was, therefore, decided to substitute piers formed of groups of cast-iron pillars resting on bases of brickwork which rose only 5 feet above high water mark. The iron pillars in the centre part of the bridge were thus 83 feet long. There were six of them to each pier, and each was cast in seven lengths, bolted together through flanges at their ends. The several pillars of each pier were tied together by wrought-iron stays.

The whole effect of these piers, surmounted by a superstructure of very open lattice work, was one of singular lightness: so much so indeed that at least one contemporary newspaper description compared the bridge to a gossamer thread. It did not, however, represent any new departure in point of engineering practice; and Sir Thomas Bouch, who designed it, built it, and remained responsible for its upkeep till it fell, had a great reputation as a builder of bridges, some of them much higher than this, though none so long.

Two of the questions which had to be answered were whether the bridge would vibrate from the weight of trains passing over it, and whether it

would oscillate in a strong wind. The question of vibration was decided by the Board of Trade test which it underwent before its opening. A number of heavy locomotives, of a total weight much greater than that of any train, were sent over it at a high rate of speed, and it showed no sign of weakness. Sir Thomas Bouch, standing during this test with his arms round one of the pillars, could feel no vibration. The bridge was passed, with the proviso that the company should limit the speed of trains passing over it to twenty-five miles an hour. But there was a hole in this rule, and engine-drivers commonly drove their trains through it.

The purpose of the rule clearly was that the speed was not to exceed twenty-five miles an hour, especially on the "high girder" portion of the bridge, where the pillars were longest, the weight carried highest, and the spans widest. But railway servants tacitly agreed to take the rule as meaning that the trains might run at an average speed of twenty-five miles over the whole of the bridge. From both ends the bridge rose towards the central spans, the gradient at the north end being steep. It will be seen, therefore, especially when it is remembered that a train had to be slowed down to a walking pace before it was allowed on to the bridge, that in order to cross at an average speed of twenty-five miles it would be necessary to run at a speed far above that limit on the level part. It was, in fact, proved that trains bound north,

and therefore probably the train which came to grief, habitually ran through the "high girders" at about thirty-six miles an hour, and sometimes at as high a speed as forty-three miles an hour.

Notwithstanding these speeds the railway men do not seem to have found any cause for anxiety. An inspector of permanent way testified that he had often been between the "high girders" when trains passed, sometimes in high winds, and had never felt any vibration or movement of the bridge; and other servants of the company, especially the driver and guard of the last train which passed before the accident, gave similar evidence. There was only one man employed about the bridge whose evidence in any way contradicted the above opinion. This man, employed in looking after the piers and pillars of the bridge, often found some of the tie bars, which tied the pillars together, "chattering," that is, a little loose. In such cases he simply tightened up the loose joints, and said nothing. Although he admitted having packed about 100 such joints, he never reported the looseness either to Sir Thomas Bouch or to the company. He had the character of a thorough and careful man; and in his opinion—he was merely a practical man, with no theoretical knowledge—the matter was so small as not to be worth mentioning. The court held that probably the loosening of the ties, slight as it was, meant that the bridge had been strained by former gales and perhaps by the excessive speed of trains; and it very much

regretted the laxness of supervision which made it possible for this man to keep his knowledge to himself. It was, however, stated on behalf of the railway company that all loose joints had been keyed up, and that the bridge was properly rigid, when the gale of December 28th came on.

In leaving this part of the subject it should be mentioned that the bridge had, since its completion, never met with an accident. No ship had ever fouled any of the piers.

The Provost of Newport, practising as an engineer in Dundee, and crossing the bridge twice daily, was the most important of the witnesses who claimed that the bridge vibrated. It was he who timed trains over the bridge, with especial attention to their speed between the "high girders," and discovered that they were going too fast. He also claimed that the high speed at which they ran set up a very perceptible vibration, especially on the journey north, on which the speed in that part of the bridge was greater. He thought the speed dangerous, and said so : after complaining three times to the station master, and being assured that all engine-drivers were warned to be very careful not to exceed the speed limit, he decided, ten days before the accident happened, for the future to cross from south to north by ferry rather than risk using the bridge, and this though he was a season-ticket holder. There were other passengers who came to the same decision, for the same reason of the excessive speed, and gave up

using the bridge for the passage north : some of them complained of the movement of the bridge itself ; one did not feel the bridge vibrate, but feared an accident to the train.

If the decisions of these men became commonly known, as seems probable, they would help to make others anxious about the bridge, especially in a heavy gale. Hence perhaps the number of watchers on that fatal night.

Among those who saw the bridge fall was the Provost of Newport aforesaid, whose house on the southern shore commanded a good view. He was doubly anxious, both from his own opinion, and because his son was a passenger. He followed the lights of the train on to the bridge, lost sight of them behind an intervening house, and saw them no more. He saw instead, an instant before they should have come into view, two great splashes of spray, illuminated for a second, as it seemed, by the falling lamps of the bridge. It appeared to him that the train had fallen at the southern part of the " high girders," which was obscured from his sight, and that either simultaneously, or immediately afterwards, the northern part of those girders fell. His observations agreed with the facts as they were proved to the satisfaction of the court ; but his opinion that " the train took down the bridge " was not definitely upheld.

Another witness, looking from the west side of the bridge near its northern end, saw " a mass of fire fall from the bridge," and recognised it as the

train. Being examined further, he said it came down slowly, with a sweep to the east, but did not speak to having seen any flashes. Another, who was looking almost down the bridge, lost sight of the train among the high girders, but did not see it fall, either as a dark body or a mass of fire : he did, however, see three separate flashes at intervals of a few seconds, each nearer to the north end than the one before it. He did not think the flashes were friction sparks, caused by the bridge breaking, but rather that they came from the rupture of the gas main on the bridge, the escaping gas being fired by friction sparks. Yet another, not far from the last named, also saw the train disappear : “ five seconds after that I saw three sudden flashes.” He could not explain the flashes. He also saw the light of the south signal cabin obscured, as he thought, by the spray thrown up by the fallen bridge.

There were other eye-witnesses, but owing to the darkness, the moon being behind a cloud, no one saw much. The most that could be decided from their evidence was that the high girders were down, the train with them, and that apparently the girders had fallen in three sections from south to north at very short intervals. For the rest the accident had to be reconstructed from the wreck of the bridge, by detailed technical consideration and careful argument.

As soon as the train was known to have fallen, men ran to the harbour master's office to get the

tug out ; but it was close on low water, and the tug was aground, nor was any other steamer available. Over an hour later the ferry boat from Fife came in, and was at once despatched to the scene of the disaster. From the storm, and ignorance of where the sunken wreckage lay, it was a dangerous piece of service, and fruitless. Nothing could be seen beyond what was known already, and nothing could be done.

There was no essential difference of opinion as to the force of the wind that night. Everyone agreed that it was a very bad storm, and that it was at its height when the bridge fell.

The harbour master had been careful to leave his wife at home when he went to church, it not being safe for her to be out ; others had had their chimney pots blown down ; the Tayport light-house keeper said that the wind had shaken his lantern, a thing that had not happened since 1859 ; a garrulous retired admiral living on the Fife side said the squalls were only short of a hurricane in violence, and that there was a particularly vicious squall about 7.20 which snapped off an old walnut tree in his grounds. Then there was an ancient mariner of eighty-six, who had sailed the North Sea and Baltic for many years, and had afterwards been harbour master at Dundee, and he, too, said that he had never seen the like. And, of course, there were others who said they had seen as bad gales in the Tay before, but, on being pressed, admitted that there had been few of them and none

worse than this. There was an observer for the Scottish Meteorological Society, but he was not very helpful, because he had no means of measuring the wind and was obviously not very good at guessing its force. There was not an anemometer of any kind in or near Dundee. But all agreed that it was a very severe gale, that there were frequent squalls in it, coming at intervals of about seven or ten minutes, and that one of these squalls came at about the time the bridge went away, though whether it was exactly at that time seemed uncertain; some said that this squall was the heaviest of the gale.

The court no doubt was influenced by the consensus of opinion, but it founded its decision chiefly on such official information as it could get. This came from the captain of the training ship *Mars* moored in the Tay about three-quarters of a mile below the bridge. He was a retired "staff commander," that is, navigating officer of the Royal Navy, and "by many tempests has his beard been shake"; he had seen a pampero off the Plate, a hurricane in the West Indies, and a typhoon in the China seas. As would be anticipated, he took a conservative view of this gale. It was a "whole" gale, Number 10 of the Beaufort scale, which went up to Number 12. The squalls were Number 11. No, it wasn't as strong a wind as blows, but about as strong a wind as blows in this country, though he wasn't sure that he hadn't known it blow harder since he had been in the Tay.

There was a vast difference between Numbers 11 and 12, much more than between Numbers 9 and 10. The glass fell six-tenths, from 29·6 to 29·0, between noon and 7 p.m., when it reached its lowest. The wind was very constant in force, with squalls about every ten minutes. Its direction was west magnetic, about W.S.W. true, and nearly square to the line of the bridge.

The captain of one of the Tay ferry steamers gave evidence that at 4.15 it was only blowing fresh, that after that time the wind and sea got up very quickly, and that at 8.15 the weather was too bad for him to cross, a thing which had not happened for a twelvemonth. He made his last trip at 5.45, reaching Dundee at 6.

The wind offered two problems to the court of inquiry for solution. Had the bridge been designed with proper provision against the wind forces likely to be experienced? And, in the event, was the force of the wind the main cause, or a contributing cause, to the fall of the bridge? The attempt to find answers to these questions involved the court in many difficulties.

Wind velocity and wind force are different ways of stating the same thing. The meteorologist is chiefly concerned with velocity; the civil engineer with force or pressure. If either can be exactly measured, and if there is an accepted formula giving its relationship to the other, then the other can also be determined. But in 1880, when the inquiry was held, and even less in 1871, when

the original design of the bridge was completed, or in 1875, when the final alterations in the design were made, there was no exact knowledge even of wind velocity, there was no method of determining wind pressure which gave more than highly conjectural results, and there was no generally accepted formula for translating velocity into pressure, and *vice versa*.

Smeaton presented a table of wind pressures to the Royal Society in 1759, in which the pressure in a storm was given as 12 lb. on the square foot ; and at the date of designing the Tay Bridge this table still retained much of its authority. Sir Thomas Bouch, indeed, admitted that when designing the bridge he had given no special attention to wind pressure. He had then intended to have all his piers of brickwork, which by their weight would have given the necessary resistance. But with the decision to use light iron columns instead of brick the case was altered, and attention was directed to an opinion given by the Astronomer Royal in 1873 when consulted as to the proposed Forth Bridge. He said that, though it was possible to have a momentary pressure of 40 or 50 lb. to the square foot over a strictly limited space, yet for the 1,600-foot spans of the Forth Bridge it would be enough to assume a mean pressure of 10 lb.

It would appear that Sir Thomas Bouch considered this opinion as applying also to the Tay Bridge ; though indeed it is only from the state-

ments of others, and from calculations made after the disaster, that we get an indication either of what pressure that bridge was intended to withstand, or of what as built it ought to have been able to resist. We are told on the one hand that the calculation was for 20 lb. per square foot, and on the other that the bridge, had its workmanship been perfect, ought actually to have been able to stand a pressure of nearly 70 lb.

Clearly, then, if Sir Thomas Bouch was even approximately right in his interpretation of what the Astronomer Royal said, the bridge was safe. Even with a pressure of 20 lb. there would have been a factor of safety of more than three; but with an assumed pressure of 40 to 50 lb. the margin of safety would have been less than a half, which is ridiculously small.

But the Astronomer Royal's opinion was intended to apply only to the Forth Bridge with its wide spans of 1,600 feet. When it referred to the very limited extent of a gust of wind, it did not mean a few feet, but rather a few hundred feet. A gust of extreme violence might be of extent enough to bear on the whole of one of the widest spans of the Tay Bridge. Also the Tay Bridge, being rigid, would be more susceptible to damage from pressure than the Forth Bridge, which being a suspension bridge could give to the wind unharmed. This opinion was borne out by the most expert meteorologists and civil engineers of the day.

The chairman's minority report summed up the argument thus: "Assuming the bridge to have been properly constructed, and to have been capable of resisting a wind pressure of 60 lb. to 70 lb., it is difficult to see how the wind alone could have overthrown it, even if it had been at its maximum of 40 lb. or even 50 lb. to the square foot. It would seem therefore that we must look to something beyond the mere wind pressure to account for its fall; and this we are told is to be found in certain faults or defects in the construction."

Then after examining in detail several of these defects, and deciding that they were present; and after considering closely the administrative system under which the bridge was both built and maintained, the report goes on: "Although then this bridge, if properly constructed in accordance with the plans and specifications, might, as we are told, have been capable of resisting a lateral pressure of from 60 to 70 lb. per square foot, and a very much greater wind pressure than was probably brought to bear upon it on the evening of the 28th of December; it by no means follows that, constructed and maintained as we have seen it to have been, a very much lower pressure would not have sufficed to blow it down. . . . Can there be any doubt that, what caused the overthrow of the bridge, was the pressure of the wind acting upon a structure badly built and badly maintained?"

No attempt was made, indeed none was possible

to decide what the wind pressure actually was. But though there was no anemometer in Dundee there were such instruments both in Glasgow and Aberdeen, and the course of the storm, as observed at those two stations, gives strong presumptive evidence of what it was on the Tay. Mr. R. H. Scott, the secretary of the Meteorological Council, gave evidence as to this ; and though he was as guarded in his statements, and as cautious of making assumptions as could be desired of a scientific man, he did not contest the suggestion that the violence of the wind at Dundee might roughly be measured by its known force at Aberdeen. He gave the force of the wind at Glasgow for the mean of sixty minutes, from 6.20 to 7.20, as having been seventy-one miles per hour, with several squalls lasting from three to five minutes with a measured velocity of ninety-six miles an hour and over ; the heaviest of all being from 7.15 to 7.18 when 120 miles an hour was recorded. At Aberdeen between 7.15 and 7.20 a squall of ninety-six miles an hour was observed.

Mr. Scott was careful to add : “ With regard to these very high velocities, I have expressly stated that I protest against its being supposed that I can absolutely swear to these. . . . There is a good deal of doubt about them ; they are merely estimation.”

To this it should be added that the way in which Mr. Scott's values were calculated gave a result higher by one-sixth than is accepted now. Thus



THE SEARCH FOR THE LOST TRAIN.

(From a Drawing in the Illustrated London News.)

the continued force of the wind at Glasgow was not seventy-one, but sixty miles an hour, which is not quite force 11 by the Beaufort scale, Number 11 beginning at sixty-four miles per hour. But, on the other hand, ninety-six, the force of his squalls, becomes eighty ; and eighty miles an hour represents Number 12, hurricane force, by the same scale. A hurricane begins at seventy-seven miles an hour. Now if there was a squall of eighty miles an hour at Aberdeen, there is likely to have been one as heavy at Dundee. It is, therefore, very probable that the squall which destroyed the Tay Bridge was of true hurricane force.

One comparison may be permitted. The heaviest squall which Mr. Scott found for that gale in the records from Glasgow was given by him as 120 miles per hour, which, restated in modern figures, is 100 miles an hour. It will be remembered that in January of this present year (1927) there was a very severe gale, which was exceptionally violent at Glasgow, and did considerable damage there. A squall of 100 miles an hour was measured in it. For comparison, therefore, it may be noticed that this recent gale appears to have been, as nearly as possible, of the same strength as that which blew down the Tay Bridge on December 28th, 1879.

CHAPTER X

STORMS OF FIRE

ONE evening in the late spring of 1902 a small group of Londoners sat at a western window admiring in after-dinner mood a sunset painted in particularly gorgeous colours. Presently, "Look," said one of the youngest. "There's a green cloud. I never saw a cloud that colour before. What has it been doing to itself?" The one was the precursor of several; from the south-west a procession of small light clouds, each of a pronounced olive green, sailed slowly across a background which exhibited almost every known shade and tint of red and yellow.

After a pause an older man said: "That'll be Martinique. But this sunset isn't a patch on the Krakatoa sunsets of '83. I was only a youngster then, but even a boy could not help noticing them, and my father, who was rather keen on such things, took some pains to tell me what it all meant. And this went on for days: three days at least, I think, though I don't like to be certain at this length of time. Those were celebrated sunsets. The old man told me I'd never see their like if I lived to a hundred; and in spite of this very excellent show I daresay he was right. There was a book pub-

lished of coloured drawings of them. I wish I had it to show you."

"You're talking Greek," the youngster answered. "I wasn't long out of the egg in '83, and can't be expected to remember what happened then. And I've never heard of Krakatoa. What was it? And what had it to do with Martinique, or this?" and he waved his arm across the north-western sky. "I don't believe anybody else knows any more about it than I do; so please explain."

"Why, as to that, Martinique is one volcano, and Krakatoa another. As you know, Martinique has just had a big blow up; and, as you don't know, Krakatoa had another, an even bigger one, in '83. One of the queer things that happen on such occasions is that a vast quantity of extremely fine volcanic ash gets blown up into the upper atmosphere, so high as to be above the winds felt on the surface of the earth. At that great height the dust is, of course, far above the clouds, and therefore can't be brought down by rain; so that, if it stops up there long enough, it can be carried to vast distances, and was so in the case of Krakatoa half-way round the globe, but only about 3,500 miles in this case. I suppose it hasn't the power of making the clouds turn green till it is settling down again and has reached their level; but if you want to know why only a few of the clouds—seemingly those nearest the earth—go green, while most of the others prefer red, and why there is all that mixed wash of colour where there seems to be no

cloud at all, you'll have to find a specialist of the right sort and consult him."

The Krakatoa eruption referred to by the speaker was the biggest thing of the kind recorded ; that it was also in many respects similar to the great West Indian eruption of 1902 will appear from a brief narrative of the two disasters.

Krakatoa is a small volcanic island in the Straits of Sunda, which separate Java from Sumatra and afford one of the principal entrances into the China Sea. The straits are only fifteen miles wide, and the island is so small as to have no room for anything but the volcano, which before the outburst stood some 2,600 feet high and was covered to its peak with tropical forest. An eruption was recorded to have taken place in 1680, but as there was no sign of activity for 200 years after that date, the record began to be regarded as doubtful, and the volcano as extinct.

It is, however, somewhat dangerous to assume that any volcano is extinct, unless perhaps it is in the moon. There was once a man who liked his own way, but was responsible to a council, which he described as consisting of extinct volcanoes, and then, quite unexpectedly—but that is another story. To resume : suddenly in 1877 there were signs of volcanic activity in the neighbourhood of the Straits of Sunda. Krakatoa did not come under immediate suspicion, perhaps because nobody lived there, and a reasonable eruption would not have mattered much. But on

August 20th, 1883, to the general astonishment, the mountain started belching forth vast quantities of ashes. An English ship which approached the straits from the southward on the 21st found ashes falling in torrents, so turned back and "stood south for 12 hours, and then came north again, but found things getting worse. Accordingly stood south once more until the weather settled. All one day it was as dark as the grave [apparently the 27th, though the captain does not mention the date in his report] and pumice stones and ashes were still coming down. On getting to the straits we came through a bank of ashes, and could only force the ship half a mile an hour. When once I got into clear water I was all the remainder of the day sailing through dead bodies of men and women."

This ship went to Singapore. Another arrived at Batavia, 100 miles east of the straits, with 18 inches of ashes on her deck, and reported having passed through masses of pumice 7 feet thick. The reports of these ships were sufficiently vague, for neither of them knew what had happened to Krakatoa itself. Nor indeed could any one know until after the event. Observations at the west end of Java and at the south-east end of Sumatra were also confined to the damage done in those districts themselves. It was quite obvious from the results that there had been a terrible explosion on the 26th, and another even worse on the 27th. The darkness which was observed at sea seems to

have extended, especially to the eastward, for some 300 miles, and to have continued for thirty-six hours ; the provinces on each side of the straits were ruined by a deep covering of ashes ; and, worst of all, a tremendous wave—what is popularly called a tidal wave, though it has nothing to do with the tides—submerged hundreds of miles of coast to a distance extending inland in places to three or four miles. All the lighthouses of the straits were either swept away or put out of action for the time being, so that Providence must have favoured the two ships which came safely through.

The vast numbers of dead met with floating at sea were those who were swept away by the great wave which overflowed the coasts. It is at least curious that the English ship which was south of the straits on the 27th did not mention this wave, which she cannot but have met. People on the spot estimated its height where it met the land as 100 feet, and judging by its effect it may have approached that height. It washed away towns, including Anjer, and villages, drowning 36,000 people ; it destroyed all the trees of the coast, even uprooting and bearing away banyans 200 years old ; it washed ships and masses of coral two, three, and four miles inland ; and it was so prodigious as to be observed at the Cape of Good Hope, nearly 8,000 miles distant, and to be still measurable in the English Channel, after traversing more than 14,000 miles of sea.

Apart from the two tremendous convulsions, there were during the two days of greatest activity frequent great flashes of flame from the mountain, accompanied by constant and tremendous hollow reverberations. The flashes were distinctly visible at Batavia, 100 miles away; the noise of the eruption, incredible as it may seem, was heard at Bangkok and the Philippines, each more than 1,400 miles distant; in Ceylon, distant 2,050 miles; in West and South Australia, at distances varying between 1,300 and 2,250 miles; and even 3,000 miles away at Rodrigues. During the recent war, the greatest distance at which man's artillery made itself heard was about 200 miles, and that too to ears which were expecting it.

The earliest reports which were telegraphed to England were chiefly concerned with the loss caused by the "tidal wave," and were sombre enough. But the correspondent of *The Times* at Batavia apparently could not prevent a vein of humour showing through even in the most unpromising circumstances. He sent through various picturesque details; for instance, on the 29th, "Birds roosted during ash rain, and cocks crowed as it cleared away; fish dizzy; town covered with thin layer of ashes, giving quaint bright look." He referred presumably to the fish at Batavia, for it may be doubted whether the fish in the Straits of Sunda would ever be dizzy again. During the similar eruption at St. Vincent in 1902 a dead whale was stranded on the shore of the

island, killed by the submarine effect of the earthquake.

The reports which were collected afterwards showed how the darkness and other phenomena were caused, and allowed a theory to be formed which would account for the greatness of the catastrophe. It appeared that in the days before the 26th columns of vapour were being shot up vertically to a height of several thousand feet, some of them preserving their form till they slowly spread out into clouds which drifted to the eastwards "discharging their ashes downwards in black streaks like the dark fringes of rain clouds seen on the horizon." This movement of the ashes in the upper atmosphere, where they were left behind by the rotation of the earth, accounts for their having fallen more thickly and to a greater distance over Java than in other directions. It was estimated that the greatest of the vertical explosions extended upwards to a height of no less than seventeen miles.

The whole geography of the Straits of Sunda was altered, and Lloyd's hastened to circulate warnings to navigators. The coasts were eaten away ; sixteen new volcanoes had appeared in the straits ; the soundings, whether by upheaval or the deposit of lava and ashes had been radically altered ; and, finally, Krakatoa itself, though it had not vanished entirely as at first supposed, had been greatly reduced in size. This brings us to the theory of the great explosions.

Imagine a closed stove, such as is used for anthracite, full of glowing coals and heated to a high degree. Open the top and pour in a bucketful of cold water. What would happen? Presumably the stove would split to pieces: certainly there would be a tremendous rush of gas and steam heavily charged with ashes.

Assume the preliminary eruptions to have worn the volcano away by August 26th to the water's edge. What would happen? The sea would rush on to the internal fires, and there would be an explosion, or series of explosions, such as could only be produced by such a heroic conflict of forces. Whether this be the true explanation or not, it is at least certain that the mountain was rent to pieces, that the ashes were carried upwards by the rush of steam and gas so high that they were borne by the winds all over the whole world, and that the din of the conflict was audible for thousands of miles. A mere earthquake, as at San Francisco and Valparaiso in 1906, at Kingston, Jamaica in 1907, at Messina in 1908, or at Tokyo in 1923, by visiting a great city may do far more damage to human property, and take a much greater toll of human life than Krakatoa succeeded in doing, but in spectacular effect it cannot for a minute compare with the best efforts of a robust volcano.

And here we come back to the most spectacular effect of all. It has been mentioned that volcanic ash from Krakatoa was observed to be diffused all

over the world. It was observed from Scandinavia to the Cape of Good Hope, and from east to west and west to east. And everywhere it had some such picturesque effect as that with which this narrative began. From the dates at which gorgeous sunrises and sunsets were seen in several places, it was estimated that the volcanic ash, when on its most direct course, was carried by the upper atmosphere at a rate of seventy-three miles an hour, or about 1,750 miles per day. But clearly the ashes were wafted hither and thither, and reached many places after long wanderings. They must have gone direct to Trinidad in the West Indies, for there on September 2nd the sun itself was blue at his setting, and the sky after he had set was so red that it was thought there must be a great fire. Again, in Southern India and Ceylon, at less than quarter the distance of Trinidad, green suns and other unusual chromatic effects were first seen on September 8th and continued till the 15th. In East Africa, at Mauritius, Rodrigues, and the Seychelles there were "unusually prolonged and intense colourations of the sky both before sunrise and after sunset." At Barbadoes the sun was "various coloured" on the evening of September 15th and the morning of the 16th, nearly a fortnight after Port of Spain had been favoured. And in England the series of beautiful sunsets did not begin till mid-October; but in compensation they went on, as opportunity offered, for six weeks, being

especially brilliant from November 8th to 10th. Similar effects were observed in New Zealand, sunsets and sunrises "gorgeous beyond precedent"; and, to show the wide dissemination of the ashes, the sun showed blue on the Gold Coast on September 1st and 2nd, when he was blue also at Port of Spain, Trinidad.

The year 1902 was one of continuous and world-wide volcanic activity, of which the eruption of Mont Pelée at Martinique, culminating on May 8th in the sudden destruction of the town of St. Pierre with 30,000 lives, stands as the symbol. But symbols, like catchwords, are apt to be misleading. Even in its own immediate neighbourhood, and at its own particular point of time, the Martinique eruption did not stand alone: it went hand in hand with the similar, and perhaps even more violent eruption of the Soufrière of St. Vincent. Only one island, Santa Lucia, intervenes between Martinique and St. Vincent, the distance between which, as measured from the volcano at the north end of each, is but ninety miles.

When volcanic activity broke out in Central America and the West Indies in April, 1902, its violence was at first confined to Guatemala, which suffered severely between the 8th and 24th of the month, and especially on the 18th by a shock which laid many towns in ruins, devastated plantations, and killed some 800 or 900 people. This record would have been memorable had it stood by itself, but it was very shortly to be

eclipsed. While the volcanic grumblings in Guatemala continued into May, those in Martinique began early in April, when Mont Pelée began to emit smoke.

This volcano, supposed to be extinct till the end of the eighteenth century, had last erupted in 1851. It rises to a height of 4,450 feet at the north end of the island, the coast of which in that part forms a semi-circle from south-west to north-east, traced with a radius of about five miles from the summit of the mountain. The doomed town of St. Pierre lies, or rather lay, some six or seven miles south of the crater, at the bottom of the shallow bay by which the western coast of the island is continued to the southward. From near the summit of the volcano gulleys, forming in some cases dry torrent beds, radiate down to the sea. Fort de France, the capital, lies some dozen miles away, on a bay at the south-east of the island.

The island of St. Vincent may be described in the same terms, the chief difference being that it is considerably smaller. In it, too, the volcano forms the north end, and the capital, Kingstown, is at the south-east of the island. But the radius from the summit to the sea is little more than three miles ; and Georgetown, the town lying nearest to the mountain, is on the east coast instead of being, like St. Pierre, on the west of the island. The Soufrière had last been active in 1812, and in that year its eruption had been preceded by earth-



ST. PIERRE, MARTINIQUE.

(From a Photograph in the Illustrated London News.)

quakes in Venezuela. The same warning was given of its outbreak in 1902.

On May 1st ashes began to fall from Mont Pelée, and the smoke from it to glow like fire. Rumbblings began suddenly and became more pronounced. On the 5th a torrent of boiling mud poured down from near the summit, reaching the sea in three minutes. On the west coast the sea receded 300 feet, and cable communications were broken. This receding of the sea which often returns immediately in a violent and destructive wave, is a phenomenon which has not infrequently accompanied even slight earthquake tremors. In the fiction of the West Indies, such as the novels of Michael Scott, it takes a regular place among incidents introduced to help out the plot.

On the 6th a dense cloud of steam rose from the Soufrière of St. Vincent. The crater formed on that mountain by its last eruption, half a mile wide and 500 feet deep, was occupied by a lake. Early on the morning of the 7th a series of violent explosions took place, and for three hours a column of steam rushed upwards, apparently carrying with it fine ashes into the upper atmosphere; from about five that afternoon a film of ash began to settle on Barbadoes, thus having been carried 100 miles against, or rather above, the prevailing trade wind by an upper current. This film reached a depth of nearly half an inch, and it was estimated that it represented a weight of 2,000,000 tons deposited on the island. These preliminaries

represented the volcano clearing its throat, as it were, and getting rid of the lake. The rush of steam was followed by the ejection of solid matter, and about noon new craters opened and six streams of liquid lava ran down the mountain side. There was much discussion as to the nature of the gases ejected, and the general decision was that probably sulphuretted hydrogen was at least one of the chief of them—a decision which serves to call attention to the name Soufrière, the “sulphur mountain.” The conditions were believed to have been precisely similar at Mont Pelée, and it was for a time widely believed that the chief destructive agent there was carbon dioxide, but this was disproved by the survival of a negro prisoner in an underground dungeon at St. Pierre. That heavy gas, had it been present, would inevitably have flowed into the dungeon and killed him. At St. Vincent an exactly similar case of survival occurred. The question was complicated by the difficulty of deciding how far the gases ejected were explosive; for though some of the flashes and explosions seen in the smoke clouds were accepted as being due to gases, the eruptions were accompanied by violent electrical disturbances with a constant play of lightning.

After the volcanic streams ran down the sides of the Soufrière there followed terrific detonations, merging into a continuous roar which was heard as far away as the mouth of the Orinoco, 260 miles distant, and the din was accompanied by flashes

of fire playing round the lip of the main crater. The destruction wrought on this day was complete as far as the northern part of the island was concerned. The destroying blasts passed down the mountain in several directions from east to south-west, destroying plantations, killing every living thing, and burying the whole country feet deep in stones and ashes. That the death roll was light, when compared with that in Martinique, was due to the fortunate accident that only some 2,000 people were within the reach of the fiery storm. There was no destruction of a town, for the torrent which came nearest to Georgetown passed it by on its northern side, being prevented from turning more to the southward by a spur of the central range of mountains which forms the backbone of the island. All the southern part of the island was protected by this range ; at Kingstown only a few stones and a sprinkling of ashes fell, and no appreciable damage was caused.

It is of interest to notice that an especially terrible blast came down the mountain on its south-western side, a black " cauliflower cloud " such as that which overwhelmed St. Pierre the next day. It wiped out the two villages of Wallibou and Richmond, and expended itself over the bay of Château Belair, which is placed from the Soufrière in the same relative direction as is the bay of St. Pierre from Mont Pelée. This blast, like the others of the same time, would appear to have been expelled from the mountain at a prodigious

rate by a crater which opened horizontally, so that the glowing stones and sand, and the poisonous gases, which in a vertical explosion are diffused in the air, were in these cases concentrated at short range on the small tract of country which lay in the line of fire. The initial speed of the blast cannot be computed ; but at two miles from the mountain it was estimated to be moving with hurricane velocity, that is, 100 miles an hour, and at four miles' distance to have been " travelling at 20 to 40 miles an hour and rapidly slowing down." Thus it died out over Château Belair.

On May 8th it was the turn of Martinique. At 7.50 a.m. the town of St. Pierre was instantaneously destroyed by a volcanic cloud like that which has just been described. An hour earlier a white cloud had emerged from a new crater which suddenly opened in the side of the mountain towards the town ; at a quarter to eight there followed loud rumblings ; and then, five minutes later, the black cloud of death suddenly descended. Not only was the town levelled with the ground and covered up by ashes, while the whole of its population perished, but the destruction extended also to the ships in the bay. Eighteen were destroyed, their crews killed by gas or the hot sand driven by the blast, and the ships themselves set on fire. One alone escaped : this was the British steamer *Roddam*, Captain E. W. Freeman, which had arrived that morning from Santa Lucia, after passing through a tremendous thunderstorm, and

had been ordered to the quarantine ground which, fortunately for her, was at the south end of the bay. She had barely let go her anchor, and, by a further piece of good fortune, consequently still had steam up, when Captain Freeman saw a tremendous cloud of smoke, glowing with live cinders, rushing with terrific rapidity over town and port. He saw the town disappear under the fiery cloud, he saw the ships north of him break into flames, and then the cloud was upon the *Roddam*. The ship's agent, who was in a boat alongside talking to the captain, had barely time to climb on board as his boat disappeared. He, like the captain, was badly burnt, as were all of the crew who were on deck. Those who were below escaped; of the burnt seamen on deck some jumped overboard in their agony, some were killed, all were more or less disabled.

The captain jumped to the telegraph and rang for full speed astern. There could be no thought of weighing the anchor, the question being whether it was possible to slip it. Fortunately by the time the chain had run out to an end the ship had gathered way enough to break its lashing. So she alone went free, with her burnt captain at the wheel steering with his elbows because his hands were too badly burnt to hold the spokes; with her deck hands lying about the deck dead or unconscious; and with a hail of hot ashes continuing to fall. In such circumstances few men would have saved the ship. The *Roddam* reached St. Lucia in some six

hours, looking like the ragged ghost of a ship ; and her captain and the survivors of those who had met the storm on deck went to hospital. Captain Freeman was burnt all over his body, and, inevitably, especially badly on his hands and face.

To have retained the power to act promptly and rightly in so tremendous an emergency was in itself no small thing, though one probably which many other ship-masters might have succeeded in doing ; but to stand in agony at the helm through long hours, the only man on whom the salvation of the ship depended, implied an endurance and devotion amounting to heroism. When Captain Freeman, happily cured of his injuries, returned to England, he was very fittingly invited to attend in Lloyd's Committee room on June 23rd, and there he was presented by the Chairman of Lloyd's, in the presence of his Committee and of many members of the Corporation, with Lloyd's medal for meritorious service, " in recognition of the skill displayed by him in his efforts to save the vessel and her crew from the effects of the late terrible disaster at Martinique."

After the 7th at St. Vincent and the 8th at Martinique the eruptions lose in human interest. They had already utterly devastated those parts of their respective islands which lay near them, killing every living thing, so that, as far as man was concerned, they had rendered themselves innocuous. If they continued erupting they could

only do further harm by striking out a new line ; and this they did not succeed in doing. There was, of course, much of scientific interest in the prolonged activity, especially as thereby one of the expeditions which arrived to study results on the spot was treated to a repetition of some of the outbursts ; but scientists are sometimes inhuman in their preferences, and so it proved in this case. Whereas general opinion, outside of St. Vincent, was convinced that the Martinique eruption amounted to a disaster of the first water, and that anything that the Soufrière had done was by comparison almost negligible, the scientists, drawing an analogy, as it were, from the yellow fever, decided that the Soufrière was much worse than Mont Pelée ; for the Soufrière reached the *vomito prieto* stage of the disease, represented in her case by the flow of solid lava, whereas Mont Pelée did not. Also it would appear that it was the Soufrière which was responsible for the expulsion of fine ash into the upper atmosphere, and therefore for the brilliantly coloured sunsets which resulted ; but Mont Pelée had the credit of these things.

From May 11th to 17th both volcanoes were comparatively quiet, but on the 17th the Soufrière broke out anew, and on the 19th and 20th Mont Pelée again followed suit, its eruption on this occasion being even more violent than that of the 8th ; but there was little damage left for it to do. Both mountains quieted down on the 25th ; and as both on the 7th and the 17th the Soufrière had

given the lead, being followed at an interval of one day or two by Mont Pelée, it might perhaps have been expected that the same order would be again observed. But this time there was a new departure. Mont Pelée began again with a violent explosion on the 26th, throwing up great quantities of stones and ashes, with the accompaniments of a dense canopy of cloud and a heavy surf on the shore, and followed up this outbreak with another like it on the 28th; but the Soufrière did not resume activity till the morning of the 30th, and on the same afternoon Mont Pelée responded with boiling mud. And the same thing happened once again on June 6th and 7th. After this date the Soufrière remained quiescent till September 11th, but Mont Pelée continued to erupt violently about once a week during the whole period.

Seismologists are working towards a law of earthquakes and volcanic activity comparable to the "Law of Storms." They had a very excellent opportunity in 1902 in collecting data, for the West Indian eruptions were accompanied or followed by earthquakes of more or less severity in all, or almost all, the volcanic regions of the earth: in Central America, in Venezuela, in Alaska, at Salonica, in Italy, in Persia, in the Himalayas, among the Azores, in Spain, in the Philippines, in one of the Japanese Islands, in Assam, in Portugal, and in many parts of the Rocky Mountains, to mention but the more important of them.



THE CRATER OF THE SOUFRIÈRE.

(From a Drawing in the Illustrated London News.)

What conclusion was to be drawn from so widespread an activity? Clearly that in the presence of a condition of such instability as it indicated no volcanic region could be considered safe; probably also that there is a certain interdependence between localities, activity in one particular district foreshadowing outbreaks in another, as, for example, that earthquakes in Guatemala may be expected to be followed by eruptions in the West Indies. There would also seem to be some support for the theory, which *primâ facie* sounds reasonable enough, that the longer a volcano has kept quiet, the more violent its eruption is likely to be when it does break out again. This seems to regard the volcanoes as steadily getting up steam between their eruptions. Whether this theory will eventually be accepted as valid does not concern us here. It is enough to notice that the three volcanoes mentioned in this chapter, Mont Pelée, the Soufrière, and Krakatoa, had been tending their concealed fires respectively for fifty-one, ninety, and 203 years; and that the violence of their ultimate outbreaks was approximately in proportion to the length of time they had been waiting to find vent. This surely is not a very consoling idea to put into the heads of those who have an "extinct" volcano for a near neighbour, such as—we speak under correction—some of the mountains of Cumberland and North Wales.

A writer who contributed to the *Geographical Journal* an appreciation of the West India erup-

tions, and of the general volcanic activity of 1902, ended his survey thus :

“ The general impression is that the northern end of Martinique is doomed. . . . St. Vincent, and possibly other islands of the West Indies are in some danger of destruction, while the general disturbance of the earth's crust gives signs of increasing and becoming more widely spread.” As a mere matter of a few years is as nothing in volcanic history, this may be recognised as a very apt forecast of the intense volcanic activity which marked the years 1906 to 1908, overthrowing several great cities of the world. It does not seem too much to expect that there will be, before very long, a recognised Law of Earthquakes ; but that men who have rebuilt their cities when they have been wrecked by former earthquakes will forsake them on being warned of future ones is more than can be anticipated. It may confidently be forecasted that the days of great volcanic disasters are not yet over.

CHAPTER XI

CHINA SEAS TYPHOONS

“FOR my part,” wrote William Dampier in 1687, “I know no difference between a Hurricane among the Caribbee Islands in the West Indies and a Tuffoon upon the coast of China or in the East Indies, but only the name”; and modern meteorologists bear him out.

It must be confessed that it would be easier to write simply of storms, by whatever name known, were meteorology a more exact science; for there is hardly one simple rule that can be laid down which is not subject to vexatious restrictions, reservations or exceptions. The first enunciation of the law of storms was truly a great accomplishment, but the early writers all made their subject appear far simpler than it really is. It is fortunately not necessary here to attempt to enter into the many difficulties of weather lore, but it does seem advisable to refer to them in general terms, if only to account for the fact that storms, like other weather phenomena, have continued to be the subject of study ever since their law was first discovered nearly a century ago. The original “statute law” is now overlaid, as it were, with a great mass of “case law”; so that he who would

understand storms, or protect himself from them, needs to know a great deal more than the original enunciation of the law.

The earlier writers on storms assumed that for practical purposes the shape of a storm system might be considered to be circular, from which assumption Piddington coined the name of "cyclone"; but it has long been known that this assumption is, especially in the case of storms outside the tropics, often very far from the truth. The so-called cyclone is often, even commonly, much longer than it is wide, thus forming an ellipse moving along the line of its greatest diameter; and, by the formation or absorption of secondary disturbances on its verge, it may become very irregular in form. Added to this is the difficulty that though by observations from a single station, as, for example, from a ship, it is possible to know approximately the direction in which the centre of the storm bears from the observer, yet it is not possible to know how far distant that centre is, or what is the shape of the whole storm system. This knowledge can only be gained after the event, by collecting observations made at several different points and plotting them for future guidance. In the same way the observer at sea has little power of discovering at what rate the storm system is moving; and this difficulty is enhanced by the great discrepancies of speed which storms show. The normal rate of progress of a hurricane or typhoon is usually stated as about

fifteen miles per hour ; but any individual storm holds itself at liberty to vary its rate of progress within wide limits. It will sometimes slow down, perhaps to five miles an hour ; it has been stated, quite probably in consequence of errors in observation or in plotting, that a speed of as much as fifty miles an hour has been recorded.

There are many other questions concerning these storms which, in spite of much zealous work, such as that performed for many years by the observatory at Manila, still await definite answers. One of these, of more scientific interest than value to the seaman, is as to how hurricanes or typhoons originate, there being two rival theories, the one mechanical, the other physical, between which the strife is still undecided. Father Algué, formerly director of the Manila Observatory, inclined to the belief that both causes were active : that the mechanical cause of the meeting of two contrary wind currents set up the whirl, and that the whirl, by creating a depression or partial vacuum in its centre, called the physical causes into action ; and that finally it depended on physical causes, especially on the amount of moisture present in the atmosphere, whether the whirlwind thus created became intense or not ; or, in other words, whether it developed hurricane force or not.

To the seaman, who stands to suffer most from these storms, a consideration of their cause is academic. What he needs to know, within as

narrow a margin as possible, is where and when he may expect to meet with them, what are the signs by which to know their approach, and what he is to do with his ship in order to avoid them. Thus it is of great value to him to know that the typhoons of the China seas form roughly along the twentieth parallel of north latitude, and the cyclones of the Indian Ocean at the same distance south of the line, and that they follow paths which, though they cannot be laid down with precision, yet can be foreseen with enough accuracy to serve as a general warning. And the Manila Observatory has done a great deal towards discovering and making known the signs which a typhoon gives of its approach.

But it still remains exceedingly difficult for the seaman to know exactly where he is placed with regard to the storm centre. He knows by the rules of the game that if he is on one side of the track of the storm he should do one thing, but if on the other something totally different; but, unfortunately, from the irregular behaviour of the storms themselves it is often exceedingly difficult to know from the observations made from a single ship—and of course to the seaman no other are possible—whether or not he is in what is known as the dangerous semi-circle. If he can discover where he is in the storm, and if he has sea-room, the rules laid down will show him how to avoid the worst of a hurricane or typhoon; “but to be caught between the land and an advancing typhoon

may be dangerous enough to satisfy the most adventurous."

Detailed descriptions of what it feels like to be in a typhoon are rarely met with, most seamen having a good deal in common with Conrad's master mariner; it is, therefore, an advantage to be able to quote from a letter written by a naval officer who had recently explored the centre of one of these storms. He was in command of the destroyer *Exe*, having in company her sister ship the *Dee*. These destroyers were then of a new type, differing from former destroyers in having a high forecastle, which, while it made them better able to steam against the sea, rendered them liable to drag their anchors if brought up in an exposed position in bad weather. This feature of the ships, had, as will be seen, its share in deciding the commanding officer to keep the sea. His letter speaks for itself:

"It was 7.0 a.m. on Thursday the 31st August that the 'X' and 'D' having completed their battle-practice off Wei-hai-wei, proceeded in company, bound for Shanghai. When we left there was nothing more suspicious about the weather than the prospect of rain from the south-east. The aneroid stood at 30.20 with a light breeze from the south-south-west. As the signal station gave no typhoon warning, we gaily set off at fifteen knots, expecting to reach Shanghai about five o'clock the following afternoon. On rounding the Shantung Promontory I steered for the middle

Saddles, so as to make certain of keeping well clear of the Shaweishan lighthouse guarding the northern channel of the Yangtse. Having so recently fired my twelve-pounder piece, I was anxious to ascertain if my deviation had altered, but the sun only peeped out for a moment, and then too early in the afternoon to render the result reliable, or reassuring. The early morning of the 1st September shewed little promise for partridge shooting or any other form of sport, including yachting.

“ At 4.0 a.m., the aneroid stood at 30.00, wind south-east, force, 3. At 8.0 a.m., the aneroid had fallen another tenth, the wind had backed to east, and had increased to 5. Toward the south-east, from which direction a considerable swell had set in, the sky presented an uncanny appearance, and the weather looked decidedly threatening. However, as I calculated that I was but seventy miles from the Saddles, I felt quite easy in my mind that I should make a land-fall by noon. I wanted to push on, but I found fifteen knots quite as much as the craft liked with the rising sea and wind. At 10.0 a.m., I was forced to reduce to thirteen knots, and an hour later to eleven knots; the aneroid then having fallen to 29.80, the wind being on the port beam blowing from the east, force about 6. At half past twelve the situation was as follows: By dead reckoning I should have been about eight miles from land (right ahead); should I force on or not? Not having been at all certain of my deviation, my assumed longitude might

have been fifteen minutes wrong. It was impossible now to see more than two or three miles. The aneroid had now dropped to 29.60 and was still falling at an alarming rate. The wind and sea were rising from the eastward, the appearance of the sky from the south-east was dreadfully ominous; in fact it seemed no longer possible to doubt the rapid approach of a typhoon. Supposing I hung on to my course, would the sighting of land be of much help? If I saw any strange land, was it reasonable to suppose that I would be able to detect its identity from the chart?

“As my range of vision was getting less than a mile, you can imagine the alluring prospect of negotiating the pilotage of those rock-bound islands in the hope of shelter.

“... So you will hardly be surprised that I determined on (what appeared to me) the lesser of the two evils. I decided to seek the open sea, where our high forecastle would come into play for our salvation instead of probably proving our damnation by blowing us ashore.

“The decision made, I signalled to my consort to lie-to—heading to the eastward. In putting the helm over, to execute this, a curious incident occurred. To face the sea, when I abandoned my design to make a land-fall, I put the helm over myself. In the act of doing so, a sea struck the ship, and a flourish I made to get hold of the wheel caused my wedding ring to fly off (my hand being wet) and to go overboard. I could not help

thinking at the time what kind of 'bad joss' this misfortune might portend. Did it foreshadow separation?

"On getting the craft's nose to the sea (east-north-east) my previous idea of lying-to underwent a shock. I had conceived the idea of keeping her head straight on, at a dead slow speed of the engines, but I soon discovered that to keep her bows from being blown off it was necessary to steam revolutions from nine to twelve knots, and this gave me a rate through the water of about three, to three and a half knots.

"As the first lieutenant was last from school, I refreshed my memory with him about the law of storms. . . . It seemed, both from the steady fall of the barometer and the direction of the wind, that we were in the worst semi-circle of the typhoon, and, if the direction of the wind remained constant from east-north-east, we had the disquieting prospect of investigating the joys afforded by the vortex of a hurricane. It appeared from the Book of the Rules that the best course for us to pursue should have been north-westerly, but as that would lead us towards a lee shore—the distance of which was an unknown quantity to me, I might be anything from ten to thirty miles—salvation in that direction was denied us. It was therefore necessary to steel our minds for the unknown delights officially reported to be in the centre of a typhoon. The first lieutenant and the gunner busied themselves in securing all move-

able gear ; and at 4.0 p.m. the first lieutenant cheerily reported that preparations for the worst had been made, and that all was snug.

“ The ‘ D ’ had been lost sight of at 3.0 p.m., but at 6.0 p.m., when the rain happened to be less torrential, she reappeared about two cables on our beam, and I then managed to repeat her the signal ‘ Rendezvous, in case of separation, etc., at Shanghai.’ The mention of Shanghai, at that early state of the game, was to my mind somewhat over-confident, but as the signal book only contains geographical localities, I had perforce to be optimistic.

“ On darkness setting in over the troubled seas, the ‘ D ’ was (not altogether to my grief) lost sight of again. The extraordinary attitudes she assumed, and the contortions she went through, were more interesting than reassuring. At times she would be poised on the crest of a sea, her fore part high and dry (so to speak) leaving her keel visible up to the conning tower ; the after part, also naked, showing her propellers racing in the air. Then she would take a dive, an intervening wave would blot out this merry picture, and then, to one’s relief as the wave passed by, a mast would appear waving on the other side until, thank goodness, one would catch sight of her funnels and then her hull, still above water. It required little imagination to realise^m that the ‘ X ’ was behaving in a similar manner. It was with great difficulty that one could hold on to the bridge ;

my avoirdupois commenced to tell on my arms and legs, and they began to get weary with the strain. . . ."

The letter goes on to describe the damage done to the ship during this time. The upper deck had been swept nearly clear, but fortunately there was no harm beyond remedy. Much water was getting below from holes in the deck where cowls had been, and the pumps were choked. The closing of these holes and the clearing of the pumps was a work of real difficulty, involving even heroism, but it was done successfully.

"As the night advanced I harboured no illusions as to any rest. How I longed for the morning, and with it the hope of better things. Here I was in a flimsy craft, with its three-sixteenths of an inch between the devil and the deep sea, deliberately having to punch away against a typhoon, and all the time knowing that every revolution of the screw, and each mile we travelled, was bringing us nearer the unknown possibilities of its centre. It seemed to me an odd sort of paradox to have to seek safety by doing my best to reach the centre of a typhoon, when, although I had seven thousand latent horse power at my command, I found myself impotent to act otherwise. By the rules, I knew what I ought theoretically to do (and now I am glad I did what I did), but at moments I must confess I wondered whether my action would have been considered seamanlike, supposing anything had happened. Up to then

I had been impressed with the idea that our salvation rested in keeping my high bows on to the sea. The shortest route out of the typhoon would have necessitated my getting the wind and sea well abaft our beam. Apart from the lee-shore objection, and my uncertain longitude, I was not completely assured whether running with such a high steep sea would altogether agree with the build of my craft, but, by accident, the early part of the first watch gave me an object-lesson of what might happen if I did not keep our bows pointed toward the enemy.

“The compass light having become extinguished, the quartermaster had to steer as best he could by keeping the wind, etc., full in his face, but as he apparently could not conveniently keep his face bang on to the wind and spray (called ‘flying spume’ in novels), he allowed the craft to be blown about five points off the wind before the mistake was discovered by the ship being nearly thrown on her beam ends, and a huge sea crashing along the upper deck. This immediately dissolved any doubts which may have lingered in my mind as to the policy of making the best use of the high bows. When I had got the craft nosing the elements again it was about nine o’clock, and by this time I felt completely tired with life—such as it was. Feeling somewhat famished, and wishing to ‘makee look see’ the state of the wardroom, I toiled aft by short rushes.”

Below deck, as might be supposed, there was

chaos, the decks awash and littered with all manner of moving property from clothes to official papers; and to obtain even the simplest kind of food was a gymnastic exercise. But this accomplished, the commander started on his voyage back to the bridge.

“ I will only mention one detail in my voyage forward. I had occasion to seek security by hanging on to the fore-and-aft awning ridge-rope which stretches from the after funnel to the ensign staff stanchion. Feeling that the ship was on the point of taking a header, and that it would be wise to anticipate a sea coming inboard, I hung to the ridge-rope letting my feet dangle. When she hit the succeeding sea, the ridge-rope suddenly slacked to such an extent that my feet felt the deck and, for the moment, I thought the ridge-rope had carried away, but, to my astonishment, as I hung on, I felt it tauten again like a bar. Thus it dawned on me how a destroyer could, thanks to modern steel, bend without breaking.

“ Midnight showed no promise of improvement as far as the elements were concerned. The aneroid was 29.35 and still tumbling down. The wind remained constant in its direction, viz., east-by-north (the significance of its consistency was appalling), and blowing for all it was worth. The rain was torrential, but it was only by putting out one's tongue that you could make certain it was rain and not drift. The deluge was a blessing, inasmuch as it undoubtedly beat the sea down

to an appreciable extent ; moreover, it helped to wash salt from one's eyes, which were apt to smart. . . . At about five o'clock, when dawn appeared to be breaking, it became evident that the crisis, as far as the typhoon was concerned, was near at hand. At four o'clock, when I took over the watch, the aneroid had shown 28.90, and at five o'clock it had fallen to 28.55—and three and a half tenths in one hour is not a bad record for a destroyer's barometer. The first lieutenant, who then paid me a visit on the bridge, making a mistake in the reading, was glad to observe that the barometer had apparently risen since he was relieved at midnight, but he was soon disillusioned, and my barograph below told the same lugubrious tale.

“ It was now blowing the most terrific gusts, and the craft was being subjected to the most alarming shocks. As the light increased, one could better foresee the approaching seas as they toppled towards us. I must confess that, ostrich like, I preferred the darkness. At times it seemed impossible that we could rise in time. The craft would take a header off the crest of one sea into the succeeding hollow. As she dived one would look aghast, and see, towering in front, a sheer cliff of sea with an ugly boiling crest about to engulf the ship. Instinctively one would hold on for dear life, maybe, also, shut one's eyes, and bow the head in anticipation of the inevitable waterfall. Often to my intense surprise, when I thought it

was all up with us (and I was so fed up with the business, that I fervently hoped then that the agony of it all would soon be short circuited), she would rise to the occasion, but only soon to experience the same feeling again.

“ There were times when she got out of step, when in taking her dive she was naked (*i.e.*, not water-borne) up to the foremost funnel, and then woe betide one's innermost feelings if she took an acute belly-flopper. . . . The water, I suppose, hitting the naked form of the ship simultaneously throughout a large area, naturally struck her with immense force. The effect was to bring the craft up ' all standing,' and the blow would be followed by an almost human shivering, which was apt to make one think that the hull had not been able to withstand it. . . .

“ At 7.0 a.m., the aneroid had sunk to 28.05, and palpitating down as low as 27.97. The rain almost ceased. Overhead it looked so bright that one expected to see blue sky. The wind had suddenly dropped to squalls as low in force as 4, and less. The sea now presented a remarkable sight. There was no consistency in its direction. The cessation of rain and the brightness overhead permitted one to see for several miles. Only the crests were breaking, and they did not seem to care which way they fell, they just tumbled over because they were too tired to remain standing up. The ocean appeared a cauldron of steep cones, each acting independently of the other, the result

being the utmost chaos. Some of these seas would clash together on opposite courses, and the effect would appear in the shape of a water-spout. I was fearful I should hit one of these columns of water, but fortunately luck steered me clear. A few fugitive land birds added interest to the scene, but the prospect of what the lower semi-circle of the typhoon had in store for us, concerned my mind more than the natural philosophy afforded by its centre. . . .

“My mind and attention were both fully occupied. For the moment I could not help feeling cheery, because every visible indication was promising; until reflection brought me up ‘all standing’ to the fact that, after all, we had only got through one half of the typhoon—there still remained the other half to be negotiated. . . .

“I do not suppose that the bright sky overhead and the cessation of wind lasted more than about ten minutes, when the squalls suddenly veered to the east-south-east.

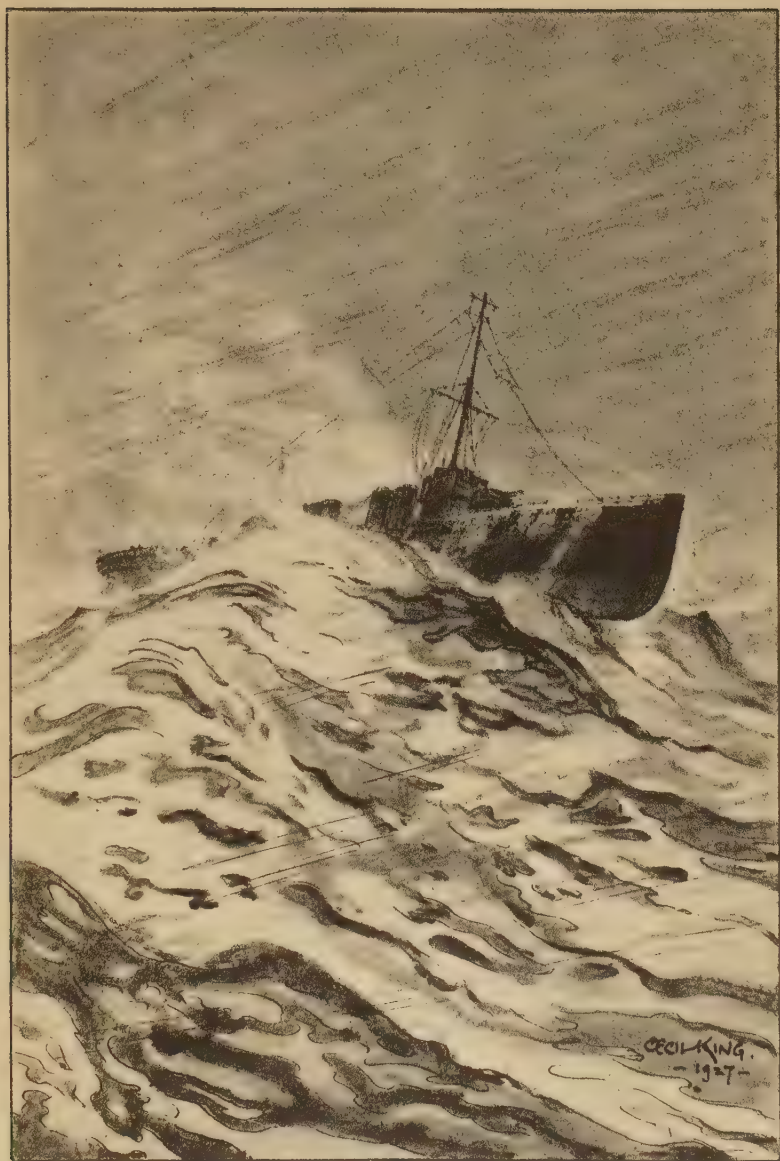
“By twenty minutes past seven it was blowing viciously from the south-east. At 8.0 a.m., the aneroid had risen to 28.15, with the wind blowing as furiously as ever from the south. In bringing the ship round gradually to face the wind, I was delighted to think that every moment now was taking us clear—carrying us towards peace and safety.

“At 10.0 a.m., the aneroid had risen to 28.50, the wind had veered to the south-west, but had

not shown any diminution in force. . . . At noon the wind had further veered to west-by-south, and it was a mighty comfort to note that the aneroid was well on its way up the next street so to speak, as far as inches were concerned—it had reached 29.15, and this gave a rise of six and a half tenths of inches in two hours. The strength of the wind had also diminished to about 8 in force. The rain was torrential, but the sea was less confused.

“With the assistance of the first lieutenant, I made efforts to conjecture the ‘X’s’ position on the chart, but the result hardly came under the navigational category of even an ‘assumed position.’ Drawing a circle of thirty miles diameter, in the hope that it would embrace us, I steered in a west-south-westerly direction, where I reckoned we should strike land by the nearest route.”

By this time the wind was steadily falling, and continued to fall, and all would have been well had it not been reported that the ship had sprung a leak. Examination revealed that the compartment in which were the fore magazines was flooded, and an attempt to pump the water out showed that the best course was to allow the compartment to fill up. So the destroyer proceeded on her way with her nose down and her tail in the air. Fortunately her “estimated position” proved reasonably accurate. She made a good landfall off the mouth of the Yangtse, and proceeded up the river without further trouble.



A DESTROYER IN A TYPHOON.

Drawn by Cecil King, R.I.

“ At 11.0 a.m., we arrived off the entrance of the Yangtse. Here, to my everlasting shame, I took a pilot. My excuse is, that the large scale chart of the river's entrance was destroyed, and that I was dog tired. Moreover, I possessed no pride at that time which could prevent me from enjoying some relaxation from the strain of the last two days.

“ Except for sore eyes, and general physical fatigue and mental weariness, life seemed remarkably sweet. The pilot, to my intense relief, had told me that a destroyer similar in ugliness to the ‘ X ’ had passed up the river two hours before us, so my cup of thankfulness was full, as she must have been the ‘ D.’ ”

Examination of the ship in dock disclosed that a considerable part of the bottom had been forced in, shearing the rivets and opening the seams.

“ When I recall (which I can without any difficulty) some of those awful belly-floppers the craft took, and realised by inspection in dock, what amount of holding power a countersunk rivet can possibly have in a three-sixteenth of an inch plate, I can only wonder that I am now in this world.

“ The Captain of the ‘ D ’ was much struck by the blue sky and calm which he experienced in the centre of the typhoon. Apparently he was about six miles behind me when he passed through the centre at 6.0 a.m. He was greatly impressed with the number of kingfishers and other land

birds which sought refuge on board the 'D' when they got into the calm vortex."

The writer concludes by mentioning that "Shanghai seems to have suffered severely owing to a flood caused by the typhoon. Five thousand Chinese are said to have been drowned by some low-lying island being flooded in the storm, but whether it be true, or exaggerated, the fact is only mentioned as a casual incident."

Floods at a river's mouth are a usual concomitant of a typhoon or hurricane. It will be remembered that the greatest loss of life on record from such a flood was caused by the cyclone which overflowed the Sunderbunds at the mouth of the Hughli in 1878.

Before taking leave of typhoons a few further considerations of their nature may not be unwelcome.

The path of some typhoons, as of some West Indian hurricanes, is directly towards the land. That of others is curved in a parabola with its vortex westward, those travelling on this path recurving about the latitude of Shanghai and passing up the Pacific coast of Japan. It may be added that it is still a subject of dispute whether a hurricane can pass over the mainland, that is, whether its centre can do so, for both on the American and the China coasts, as also on that of the Bay of Bengal, it is common experience that the winds which rotate about the centre make themselves felt as strongly on and near the coast

as they do at sea. To the inhabitants of Shanghai, Canton, Madras, and Calcutta the point raised might seem to be a distinction without a difference; for, even if physical causes do in truth prevent the actual centre from passing inland, depriving it of its activity as soon as it leaves the water, yet it is not disputed that when the hub of the revolving storm is actually on the coast line, a semi-circle of the whole storm system is causing havoc over the land.

Whatever may be the answer to this question, it is at least certain that a typhoon may do an enormous amount of damage at its point of impact on a coast; and this is caused not so much by the force of the wind as by what is known as the storm wave. The theoretical explanation of this phenomenon was stated, by a writer in the *Edinburgh Review* in 1905, as that "with the partial vacuum in the centre of the typhoon, the water rises as it will in a partially exhausted glass vessel. . . . But as the extreme depression of the barometer in the centre of a typhoon does not exceed three inches, equivalent to a column of water of about three feet, it would seem as if a storm wave so produced could not be more than three feet deep, whereas terrible experience shows us that it may attain a depth of forty feet, and that it may submerge vast districts of low lying land with enormous destruction of life and property. . . . The explanation is that the pile of water due to barometric depression extends over a very large

area, and is suddenly thrown on a comparatively small one, and that it drags with it other water, heaped up, it may be, by the force of the wind." To which it may be added that when this wave flows into the bottom of a bay, as at the mouth of the Hughli, or the mouth of a river, as at Shanghai, it becomes constricted and rises to a great height for the same reason that causes the tides at the head of the Bristol Channel and of the Bay of Fundy to rise exceptionally high.

CHAPTER XII

THE WINDS AND SUPERSTITIONS

“ KING ERIK of Sweden,” says Olaus Magnus, “ was in his time held second to none in the magical art ; and he was so familiar with the evil spirits whom he worshipped, that what way soever he turned his cap, the wind would presently blow that way. For this he was called Windycap.”

This power of commanding the wind is common to the folklore of all ages and of many peoples. It is familiar in classical mythology ; it is found widespread in the narratives of early travel ; and traces of it might still be found among the seamen of civilised races. It appears indeed that the spread of education has by no means rooted it out, and that it is now languishing and dying out only in proportion as ships cease to depend on the wind for their motive power. If you have 5,000 or 10,000 horse power under your deck you no longer need a spæwife or a Russian Finn to sell you a fair wind.

It should be noticed that many, if not most, sea superstitions are very catholic in their outlook. If you wish for good fortune at sea you must do this, and must not do that ; if you do such and such things, or neglect such others, disaster will

overtake you. The legend accompanying the observance omits, for the most part, to specify the nature of the prospective evil, just as do the still current superstitions, such as those which tell us that it is unlucky to break a looking-glass, or to see the new moon through glass. With seamen there was always a strong probability that the wind would have most to do with their good or ill fortune ; they might have a foul wind, or not enough wind, or too much of it. Calms and head winds might not spell a prosperous voyage, but gales of wind always introduced considerations of disaster. Therefore superstitious beliefs and observances, nominally quite general in their application, came to be regarded as being primarily a form of insurance against storms and their effects.

It will be enough to cite a few instances, chosen almost at random ; introducing them only with the remark that religious observances which seemed strange to Christians were inevitably superstitions, and, where they were maleficent in intention, were prompted by the devil. Thus Marco Polo of the inhabitants of Socotra :—

“ The inhabitants deal more in sorcery and witchcraft than any other people. . . . If any vessel belonging to a pirate should injure one of theirs, they do not fail to lay him under a spell, so that he cannot proceed on his cruise until he has made satisfaction for the damage ; and even although he should have a fair and leading wind, they have the power of causing it to change, and

thereby obliging him, in spite of himself, to return to the island. They can, in like manner, cause the sea to become calm, and at their will can raise tempests, occasion shipwrecks, and produce many other extraordinary effects . . .” Clearly a community with which it was advisable to stand well, though the chief part of their witchcraft seems to have been directed to a reasonable purpose.

The Lapps, as pictured by Master Giles Fletcher in his book of the Russ Commonwealth, were in the sixteenth century warlocks of much the same breed as the Finns have been down to our own days: “For practise of witchcraft and sorcerie they passe all nations in the worlde. Though for enchanting of ships that saile along their coast (as I have heard it reported) and their giving of winds good to their friends, and contrary to other whom they meane to hurt by tying of certaine knots upon a rope (somewhat like to the tale of Æolus his windbag) is a very fable, devised (as may seem) by themselves, to terrifie sailers for comming neere their coast.” But it is doubtful whether the sailors of Mr. Fletcher’s time regarded this “very fable” with his critical eye. It is much more likely that then, as later, many of them inquired the price of these “certaine knots,” and paid it too if they could. This belief is one of the last that has lingered. It has been common to the whole of north-western Europe, the power of the winds being ascribed to Scandinavians, or rather to their witches, from time immemorial; to

Russian Finns, *ex officio* ; and even to Scottish witches who presumably were either of Norse descent, like Norna of the Fitful Head, or had acquired something of the magic of the Norsemen.

Thus Sir Walter Scott tells of one Bessie Miller, who lived at Stromness in 1814, still practising as a humble heir, or perhaps imitator, of Erik Windycap. "Her fee was extremely moderate, being exactly sixpence, for which, as she explained herself, she boiled the kettle and gave the bark the advantage of her prayers, for she disclaimed all unlawful arts. The wind thus petitioned for was sure, she said, to arrive, though occasionally the mariner had to wait some time for it." There are stories of captains even of the nineteenth century who, meeting with persistent head winds, succeeded in discovering the presence of a Russian Finn among the crew, and having discovered him put him in irons and otherwise made his life a burden to him till he shed his obstinacy and caused the wind to change. Even as late as 1857 one of the crew of the *Ruby Castle* was murdered at sea, and the murderer, being brought to book in England, pleaded on his trial that the man was a Finn, and, with his storm-raising powers, a danger to the ship: he had therefore taken the precaution of putting him out of the way of doing harm. We may assume that Dirk Hatteraick, had occasion arisen, would have done the like, but we are only told that he played for a fair wind and good luck by taking Meg Merrilies down to the beach with him

when he embarked. He himself went off to the lugger in his boat, while "the gipsy remained on the shore, reciting or singing, and gesticulating with great vehemence."

Mannering inquired of Mr. Bertram "what Captain Hatteraick so earnestly wanted with the gipsy woman." "Oh, to bless the ship, I suppose. You must know, Mr. Mannering, that these free traders, whom the law terms smugglers, having no religion, make it all up in superstition; and they have as many charms, and spells, and nonsense——"

"Vanity and waur," said the Dominie. "It is a trafficking with the Evil One."

Jonah's whale perhaps springs from the same source as the malevolent sea monsters which of old peopled the northern seas, as well as the Mediterranean, and traditionally maintained their vogue long enough to allow of our becoming acquainted with them from their representation on charts. But the story seems to stand by itself. The whale is a humble instrument in the development of the plot, and the interest centres always on Jonah. It is his misdoing that causes the storm, and sets the mariners on an inquiry as to who is responsible: "Come, let us cast lots, that we may know for whose cause this evil is upon us." We do merely lip service to Jonah nowadays. A Jonah is merely an unlucky person, who can communicate his ill luck; and if we wish to be at the pains of rendering him harmless, we have but to

provide ourselves with a mascot by way of antidote. But we have it on the authority of Bullen, in his *Log of a Sea-waif*, that as late as 1871 he himself, in a British ship, was pronounced to be a Jonah, and that the crew seriously proposed to murder him and throw him overboard as the only way of getting a fair wind. And, but for the intervention of the boatswain, they would have done it.

It is difficult to know what is, or has been, the precise significance of several little ceremonies observed on board ship, and sometimes ashore. We may suppose that a piece of silver thrown overboard is either a bribe to a maleficent spirit ; or else that it originated in the efficacy against the devil of any kind of token with a cross on it. But what is the meaning of planting a coin, by rights minted in the year of the building of the ship, in the mast-step of a new ship before stepping her masts ? Does it ensure fair winds, or does it guard against storms ? Latterly it has chiefly been remembered by ship breakers on the look out for a small perquisite : now perhaps it is almost forgotten. It is probably analogous to the old Parsee rite of driving a silver nail into a ship on the stocks, " which if it shall not be driven, the ship will never be launched."

Many little superstitious observances and taboos have been very completely forgotten, such as those relating to the cutting of the hair at sea, or of pointing the finger at a ship met with ; but others

are remembered. We still speak of whistling for a wind, and perhaps a few still have occasion to do so, having no motor to turn on ; but if they do follow the old practice, it is to be hoped that, for their own sakes, they remember that there are occasions when you must not whistle at sea. Whistling is a petition for more wind. If you whistle when you already have as much as you need, you are tempting Providence, and are likely to get a gale of wind which will wreck the ship out of hand. Then there is the tradition of the knife in the mast, usually stuck there in a calm when the crew is whistling. By tradition it ought to be a little black knife. But why ? And is its effect only that of bringing wind out of a calm ?

Is it true that Davy Jones hailed from Tredegar, and “ left the domains of Ap Morgan, to follow the sea ” ? Follow the sea he did most certainly ; but it would be hard to say since when, or why he took to it. One more than suspects that Neptune in the sea ceremonies of recent times—is he found in that galley as early as the seventeenth century ? —is no survival, but a mere piece of pseudo-classical Wardour Street. If so, what is his relationship to Davy Jones ? Is he Davy under an *alias* ? Or is the realm of the sea parcelled out between the two deities, the one man’s friend, the other his foe ? It would seem that no one has yet sought to explain the intricacies of sea mythology. When the attempt to do so is made, it will be necessary to trace Davy back under some other

name ; to see if he be in truth of Welsh descent (which is doubtful), or of Scandinavian, or of Greek. At present it must be confessed that we know little more of him than Commodore Trunnion did, or than the commodore's chronicler Smollett :

“ ‘ By the Lord, Jack, you may say what you wool ; but I'll be damned if it was not Davy Jones himself. I know him by his saucer eyes, his three rows of teeth, his horns and tail, and the blue smoke that came out of his nostrils. What does the blackguard hell's baby want with me ? I am sure I never committed murder, except in the way of my profession, nor wronged any man whatsoever since I first went to sea.’ ” This same Davy Jones, Smollett adds in a note, “ according to the mythology of sailors, is the fiend that presides over all the evil spirits of the deep, and is often seen in various shapes, perching among the rigging on the eve of hurricanes, shipwrecks, and other disasters to which a seafaring life is exposed, warning the devoted wretch of death and woe.”

He is therefore the enemy of sailors, to be fought with when met ; and just as Trunnion did his best to floor him with his crutch, so Matthew Barker's groggy bluejacket fought three rounds with him one night on an island off the French coast. He still lives at the bottom of the sea, but seldom if ever puts in an appearance above water nowadays. It may be that his time is fully taken up with stowing in his locker what comes to hand ; cer-

tainly he seems no longer to have need to go about boarding ships and seeking the wherewithal to fill it.

Perhaps black cats, when they die violent deaths at sea, are enrolled among the mysterious and elusive body of his attendant sprites. If not, how is it to be explained that a sea-going black cat, as long as he is alive, is among the most lucky of animals: yet if you do him to death in any way while still afloat, he develops power to drag the ship down after him to the bottom of the deep? He is lucky, because he can be useful by foretelling gales. This he does by becoming extra frisky, as if he enjoyed the prospect, and by fluffing up his tail till it looks like a bottle-brush. "That cat has a gale of wind in his tail" was formerly a phrase of not uncommon use. The ghost of many a black cat has caused a ship to founder in a gale of wind, and the manner of his doing it may be studied in Marryat's *Poor Jack*. But even so malignant a ghost as this is not always wholesale in his destruction: it is shown in *The King's Own* how he sometimes may doom to death the guilty members of a crew, letting the rest go free.

Then there are beneficent apparitions and portents, and not a few of them.

" Safe comes the ship to haven
Through billows and through gales,
If once the Great Twin Brethren
Sit shining on the sails."

The Great Twin Brethren were Castor and

Pollux, who with the rise of Christianity changed their names, as is somewhat inadequately described by Sir Thomas Gates : “ We had an apparition of a little round light, like a faint starre, trembling, and streaming along with a sparkleing blaze, halfe the height upon the main mast, and shooting sometimes from shroud to shroud . . . and for halfe the night it kept with us ; running sometimes along the maine yard to the very end and then returning. . . . The superstitious seamen make many constructions of this sea-fire, which nevertheless is usual in storms : the same (it may be) which the Grecians in the Mediterranean were wont to call Castor and Pollux, of which, if one appeared without the other, they took it for an evil sign of great tempest. The Italians, and such who lie open to the Adriatic and Tyrrene Sea, call it a sacred body, *corpo sancto* ; the Spaniards call it St. Elmo, and have an authentic and miraculous legend for it.” The English, it may be added, call it by both names, or by derivatives of them, and by others besides ; and their superstitions concerning it are, or have been, various. If, for instance, the fire descends from the place where it is first seen, it is a bad sign : if it ascends, it is a good sign. These signs affect the ship and crew as a whole. But a *corposant* may convey a warning of death to one selected victim, which it does by shining on his face. Michael Scott doomed one of his characters to sudden death by lighting up his countenance in this way. It must

be admitted that the English interpretations of this phenomenon depart considerably from the classical original ; but they are conservative to the extent of recognising that it should be accompanied by a gale of wind.

There are other animals which help, some of them though they do not go to sea ; but it must be confessed that these shore-keeping animals confine their warnings chiefly to fishermen. There are still probably fishermen who will not go to sea should a hare or a rabbit cross their path while they are on their way to their boat. Some will go home and lose their trip : others will go back home and take a new departure, for the appearance of these animals on such occasions is a warning of unspecified evil. In many parts also it is taboo to mention them. The fisherman would not dream of doing so. If he did he would lose his boat, or his nets, or perhaps his life : certainly something dreadful would happen. And it is almost as bad should an ignorant landsman mention them directly when in speech with a fisherman. If he must needs refer to them, he must do so indirectly, by some such phrase as " those furry things." So the evil may be averted.

Some misguided persons have considered that pigs are unlucky ; but deep-sea seamen used commonly to make a pet of the ship's pig which was destined to become fresh pork before the voyage was out. An Irishman may have an affection for a pig, but cannot reach to the pitch

of devotion shown by a negro ; and a negro is a lucky man, one of the few races that can be trusted to summon up a fair wind when he takes his trick at the wheel. Would he have this power if the pig on which he lavished his affections was a maleficent beast ? And besides, a pig is a creature with a unique gift : it can see the wind. But what good comes thereby either to the pig itself, or to the ship, has never been explained, though so rare a quality seems to merit explanation, or even admiration.

The sea serpent ? No : he does not come into this story—perhaps because he is no myth or legend, but begins to approach the realm of scientific fact : certainly because he has never been accused of brewing gales of wind. He used, in old times, before he developed a barbel's feelers, to be carnivorous and a terrible scourge of ships which sailed the northern seas ; but of late, if we may accept Mr. Jacobs's word for it, he has taken to following ships for bread in mid-Atlantic, and has become a timorous beast, that can be scared almost out of his life by a toot on a steam syren. A degenerate creature of this kind can surely bear no affinity to Loki, whose son, the original sea serpent, was for his wickedness condemned to lie encircling the world three times, and endeavouring to bite his tail. His uneasy stirrings and the heaving of his coils caused storms and heavy seas in the brave days of old.

There are several birds, too, which have, or have

had, an influence on seamen's lives, foremost among them being Mother Cary's chickens, the stormy petrels. Mother Cary, Mater Cara : so the name is traditionally explained ; and the French name for the same birds, *les oiseaux de Notre Dame*, lends weight to the explanation. The Holy Mother has always been the protectress of seamen. What more likely, then, than that she should send her birds to warn them of the coming storm ? But the messengers must be treated as they deserve. To kill one brings disaster to the slayer ; and if more than one be killed, more lives in proportion must be sacrificed in atonement. The reason for this is very simple. The bodies of these birds are the receptacles of the souls of departed seamen. To kill them therefore is murder, for which the price must be paid, a life for a life.

There have been those who have ascribed the same quality to the great white albatross. But the mythology of the albatross is obscure ; and in any case whether he once " brought the fog and mist," or " caused the wind to blow," or whether he was a departed seaman in another form, has been very completely forgotten. For many years past few seamen have made any scruple of catching him and converting him into feather tippets (seamen and albatrosses cannot be expected to move as rapidly as feminine fashions), pipe stems, tobacco pouches, and other useful articles or ornaments.

That keen naturalist, the late Admiral Sir A. H.

Markham, shot an albatross in 1881. He was then captain of the flagship on the Pacific station, and as his chief still held the old superstition, the bird had to be smuggled carefully below and kept out of sight. Eventually Markham gave it to the Natural History Museum at South Kensington, where it may still be seen. A dozen years later when Markham's flagship, the *Camperdown*, rammed and sank H.M.S. *Victoria*, the albatross was remembered. It is unlikely that at that late date any one believed that the death of the albatross was the cause of the disaster ; but some notice was taken of the long arm of coincidence.

Land birds also, such as the swallow, were in olden times thought unlucky at sea, though lucky on shore. Cleopatra abandoned a voyage on seeing a swallow at the masthead of her vessel. Mancinus, a Roman consul, foretold his own defeat on seeing one alight on his galley ; and the death of Mark Antony was predicted by soothsayers from a like omen. Shakespeare alludes to this superstition:—

“ Swallows have built
In Cleopatra's sails their nests ; the augurers
Say, they know not—they cannot tell ; look grimly,
And dare not speak their knowledge.”

The wren was formerly a sacred bird in England. On the Isle of Man it was the custom to hunt the wren on a certain day, and feathers acquired at this time were treasured up as charms against shipwreck. McTaggart says : “ Manx fishermen dare not go to sea without one of these birds,

taken dead with them, for fear of disaster and storm. Their tradition is of a sea-spirit, that haunted the herring-track, attended always by storms, and at last assumed the figure of a wren, and flew away ; so that they think that when they have a dead wren with them all is well." This sounds rather cryptic ; but there is the fact.

The dove, too, was a bird of good omen at sea. It has always been a bird of mystery—the incarnation of the Holy Ghost, and the sign of immortality to the Christian. To the ancients it was always a mariner's bird. A dove brought good tidings of land to Noah when perforce he had turned mariner. Radegonde in the legend comes in the guise of a dove to rescue sailors from shipwreck ; and in Italian folk-lore, a dove perching on the mast or rigging of a ship is an omen of a favourable voyage. The appearance of a dove, in fact, had this much connection with gales of wind, that it showed that none need be expected.

Other sea superstitions there are, many of them of obscure origin and meaning. What, for example, can be made of the belief that if a glass is knocked and rings, the ringing must be stopped immediately or a man will drown ? It is a comprehensive sort of belief, and must needs include men washed overboard in gales of wind. Perhaps the ringing of the glass was the passing bell of a seaman *in extremis*. But its explanation certainly does not lie on the surface as does that of the eggshells. You must always drive your spoon through

your egg-shell when you have emptied it : otherwise a witch will use the shell as a boat, and will go to sea in it to brew storms and otherwise torment mariners.

Friday has always been as unlucky a day as any date with the number 13 in it ; but nowadays the cautious seaman no longer trips his anchor on Thursday, and shifts berth a few yards, in order to remove the curse from a voyage necessarily begun on Friday. But inevitably, though unlucky days cannot be shunned, if bad luck visits the ship on an unlucky day, the coincidence is remarked. Thus when in June, 1913, the British ship *Monkbarns*, running her easting down before a heavy gale in the " Roaring Forties," was broached to and laid on her beam ends three times in rapid succession, it was remarked on board that the day was Friday and the 13th of the month.

It is impossible to think of the legends and superstitions of the sea without remembering the *Flying Dutchman*. She, it must be admitted, is a difficult subject, deserving of more attention than has been bestowed on her. There were ghost ships before Vanderdecken, having this in common with his command, that they boded ill to all who saw them ; but what form the ill would take, and whether the *Flying Dutchman* was allowed to cruise in waters other than those where Vanderdecken incurred his doom, these are among the matters which remain doubtful.

Certainly Marryat, when he made the legend of

the Phantom Ship the basis of a story, considered that he might allow himself a free hand. "I have seen her," said Philip, the hero of the tale; "there are various stories afloat concerning her; but I am fully persuaded some accident will happen before we reach port. There is no saying from what quarter the danger may come: we have other things to fear than the violence of the gale." On that occasion the threatened ship perished by fire; and on another by being lured ashore by a false light shown by the ghost ship in fine weather. If, therefore, Vanderdecken's own son was treated in this indiscriminate manner, and was content to be indefinite in his beliefs, a good deal of uncertainty as to the nature and powers of the phantom ship may be excused. If we believe Philip's account of her we have at least this much consolation, that we are never likely to incur disaster by falling in with her. For Philip laid the ghost.

